# The Builder.

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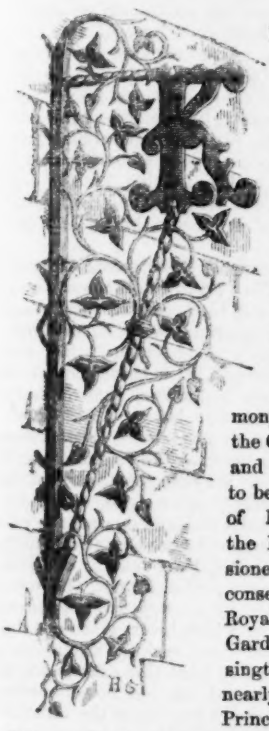
*A Paper of Paragraphs.*



KENSINGTON and Brompton will be in a bustle at the beginning of April, when the National Portrait Exhibition will be opened; and this bustle will scarcely have subsided when it will be renewed by the International Horticultural Show; to say nothing of a possible Royal ceremony in connexion with the Central Hall of Arts and Sciences proposed to be erected on the plot of land, belonging to the Exhibition Commissioners, between the conservatory in the Royal Horticultural Gardens and the Kensington High-road, and nearly opposite to the Prince Consort Memorial, now in slow progress. For the purchase of stalls and boxes in the Hall, the sum of 47,300*l.* has been already subscribed, the price for a box in the first tier in perpetuity being 1,000*l.*, payable by instalments; for one in the second tier, 500*l.*; and for a stall in the amphitheatre, 100*l.* The Hall,—which is to be available for, amongst other purposes connected with science and art, congresses (both national and international), performances of music, *conversazioni*, and exhibitions of works of art and industry,—consists, according to the published plan, of an arena, an amphitheatre, and two tiers of boxes, with a spacious corridor above these, affording room for the exhibition of pictures and sculpture. The building is an oval in plan, about 270 ft. one way and 215 ft. the other; is to accommodate 5,600 persons; and is estimated to cost 200,000*l.*, exclusive of the value of the land, which will be granted by the Commissioners for 999 years, at a merely nominal rent. The Commissioners will also guarantee a considerable part of the money required for the building, provided the public subscribe the remainder needed, say 150,000*l.*, by May, 1867. If we understand rightly, the design adopted by the promoters of the undertaking, was made by the late Captain Fowke. They will now, doubtless, call in for their aid the best professional advice that can be obtained: at any rate, they will be unwise if they do not.

The Portrait Exhibition is beginning to get into shape. It will consist of about 1,000 pictures,—there is not room for more in the remnant of the 1862 Exhibition Building (adjoining the south side of the Horticultural Gardens), in which they are being hung,—and will illustrate the notabilities of Great Britain, up to the end of the reign of King James II.; in other words, the year 1688. Of its completeness, so far as it goes, or its incompleteness, the time has not come to speak. We are quite satisfied, however, that whether looked at in the aspect of art, or in the aspect of history, it will be found full of interest, pleasure, and instruction. We may hope that hints in our own pages have not been altogether useless.

Another good thing is contemplated at Brompton, a thing calculated to be of much advantage. The Lords of the Committee of Council on Education have decided on producing a Universal Catalogue of all books from the invention of printing, relating to or calculated to aid the study of the fine arts. They have invited the co-operation of a number of gentlemen, as a Committee of Advice, and Mr. J. H. Pollen is to act as secretary. The idea appears to have grown out of the necessity of forming such a catalogue of works for the Art Library in the South Kensington Museum, as would not be made useless by the almost daily increase of this most valuable collection, to the importance and accessibility of which we have before drawn attention. The new catalogue will be a universal record of printed art-books known to exist up to the period of its completion, wherever they may happen to be at the time. A reader would thus find a clue, not only to the works he was looking for in the actual collections of the library, but to other works bearing on his course of studies which had not been obtained, but which had been ascertained to form part of other libraries, whether public or not, either in our own or in any foreign country. All names of rare books would have a reference given to the libraries in which they are to be found. By this means also the deficiencies of the Art Library would be demonstrated, and provision made for its ultimate completion. It can scarcely be questioned that such a catalogue would prove a valuable acquisition to art literature throughout the world, and would have such an international interest as to justify her Majesty's Government in inviting the co-operation of other Governments towards its accomplishment. We shall look forward to its progress with the greatest interest. Several knotty questions will have to be settled before starting: as, for example, to what classes of works should the collection be limited? What kind of works, not strictly art works, are necessary to an Art Library intended for general use? How shall it be decided, if works containing only scattered notices or information are to be admitted, which of them is or is not admissible? And, larger question still, where would such a catalogue stop? With the aid they have in view, right solutions will doubtless be arrived at. Where there is no difficulty to be overcome, there is no credit to be gained.

As a sum of money is set down in the Civil Service Estimates for the Museum proposed to be erected on the site of the 1862 Exhibition Building, it may be concluded that operations will soon be commenced there. As the architect to whom the first premium in this case was awarded is unhappily dead, it will be but common justice to place the matter in the hands of the gainer of the second premium, Professor Kerr; the more so as the superiority of his plan appears to have been strongly advocated by the officers of the Museum even during the lifetime of the more successful competitor.

The same document,—the Civil Service Estimates,—shows that although it is premature to state that the Chancellor of the Exchequer intends to restore the Westminster Chapter-house, he certainly desires to do so, and proposes to ask the House for a first grant towards it. 7,000*l.* is the sum named for preliminary works. The woodwork now lumbering up the interior should at once be cleared away, so that we may see what is really left of the old structure and its decorations. The destroyed stonework should be renewed, — such as the roof and in the windows;—and we should then be in a position to discuss as to how much or how little of modern decoration should be permitted.

The resolution of the House of Commons, the other evening, praying Her Majesty to permit the erection of a monument in Westminster Abbey to the memory of the late Lord Palmerston, brought from Mr. Beresford Hope a very proper expression of demand that the monument should be worthy of the statesman and of the pile in which it is to stand. We sincerely wish so too. Sir John Pakington alluded to the obvious unseemly delay, often commented on, in the erection in St. Paul's Cathedral of the monument to the Duke of Wellington, ordered by Parliament a dozen years ago. What is Mr. Stevens about? Some explanation is due to the public and to himself. He showed the possession of high qualities and induced strong hopes, but years are passing away without the expected fruition. Our sculptors generally appear slipping out of position. They should wake up. Her Majesty has already, in reply to the House, commanded the erection of a monument to Palmerston.

We mentioned last week the names of the architects who had been invited to compete for the honour and profit of erecting the proposed new Law Courts. We may add, that the outlay they are to contemplate in preparing designs is 850,000*l.* It is to be hoped that we shall have something good for the money: not architecture of the moment, but architecture for any time, architecture of principles. As is written on the frontispiece in Lebrun's "Théorie de l'Architecture Grecque et Romaine,"—"*En Architecture, lorsque le Principe est absent, les produits sont constamment ruineux et defectueux.*"

The following six architects have been nominated to submit designs in competition, as well for the enlargement and re-arrangement of the present National Gallery as for an entirely new building:—Messrs. Brodrick, Banks & Barry, Pennethorne, Scott, Street, and M. D. Wyatt. The designs are to be submitted in October next.

The conditions offered to competitors, in both cases, are not thought to be quite satisfactory, we hear, but will doubtless be made so on representation. Both lists should be enlarged, so as at any rate to include architects who have gained honours in previous Government competitions.

Will the Royal Academy go to Burlington House after all, and build for modern art a proper palace? They do not know themselves; how, therefore, should we? They do not believe that the Government are in earnest in the matter, and naturally enough, therefore, they refuse to discuss what may never need solution.

Concerning Burlington House, we have had more than one suggestion that great advantage would be gained by the removal of the railings in front of it, in Piccadilly, and we would gladly aid in bringing this about. Some few feet of the railing have already been taken away for a drinking-fountain, and we can see no sound reason why the remaining part of this iron-work should not be taken down. Pedestrians would be greatly benefited; the present footway being inconveniently insufficient. We have little doubt that Mr. Cowper, whose disposition towards such improvements is well known, will give the subject candid consideration. There will be no need of "railing" to get his attention.

Mr. Cowper very properly and vigorously defended the Metropolitan Board of Works in the House of Commons on Monday night when they were attacked, through Mr. Tite, for asking leave to postpone the Thames Embankment (Approaches) Bill until the 18th of this month, with the view of obviating the necessity of touching Northumberland House. We should grieve to lose Northumberland House notwithstanding the sneers of Mr. Locke, who could see nothing about it but a lion with a stiff tail. What led this gentleman to abuse Mr. Tite so coarsely as he did is not so obvious as the aforesaid tail. It was certainly not Mr. Tite's tale, for that was perfectly simple. He stood there to communicate the request of the Metropolitan Board, and to give clearly and pithily their very good

reasons for making it. A fitting road from Charing Cross down to the Embankment may surely be formed without destroying the only one of the old Strand houses remaining. What the Board of Works intend to do with the fine river frontage between Northumberland House and the Savoy Chapel may very properly be looked after.

The President of the Institute of Architects, who also had a spar with the past president, said an architect employed by the Board of Works was to erect upon the site "a hideous crescent." There is probably some little misunderstanding about this: the Board of Works are surely not about to become builders on their own account. It is true, they might, nevertheless, dictate the elevations; but they would surely not prevent the adoption of anything better than their own *datum* scheme if it were proposed to them.

At the Institute, by the way, the proposal of the Council to recommend for the second time, so soon after the first, Mr. Butterfield for the Royal Gold Medal, has been received with disfavour;—and at the last meeting Mr. Digby Wyatt was proposed in opposition by a memorial from Mr. Owen Jones. The election will take place next Monday evening, and will be sharply contested. The members of the Institute must give consideration to the course to be hereafter adopted in the appropriation of the medal, or it will become difficult to keep the honour at the right standard.

Talking of medals, we may note that the Council of the Art-Union of London have determined on the production of medals in commemoration of Gibson and Sir Richard Westmacott. The first will be confided to Mr. Joseph Wyon; the second, to Mr. Leonard Wyon; while Mr. George Adams has in hand for them a medal of Dyce. With the note that there has been a rush of subscribers, as we expected, for copies of "The Story of the Norman Conquest," we will end our paper of paragraphs.

## COMPENSATION TO OUSTED OCCUPIERS.

A NEW and genial member of the House of Commons has already done good service on behalf of a class who have been sore sufferers from recent legislation, and for whom we have often spoken. If we count up the number of the members who represent the various metropolitan districts, and bear in mind that the great bulk of their constituencies consists of persons engaged in trade, it may seem absurd to say that the shop-keepers of London have been unrepresented in the House of Commons. Yet their most important interests have been so entirely neglected hitherto, that Parliamentary powers have been taken, again and again, empowering the recipients to destroy long-established and thriving businesses without redress and without compensation.

It will be well remembered by those who took interest in the first introduction of the railway system into this country, that the opposition of the landowners was one of the greatest difficulties with which the engineer had to contend. Not only did the great territorial magnates compel him to keep at a respectful distance from their parks and ornamental property, but such prices and such compensation were demanded at every step as to make a very considerable item in the cost per mile of the new roads. The towns, indeed, in most instances, succeeded in keeping the new accommodation offered to their traffic at bay, and termini were fixed in suburbs to the great inconvenience of the mass of travellers.

With the growth of a generation who have heard the steam-whistle in their cradles, the need of a more rational mode of determining the centres of traffic has become apparent, and large central stations are everywhere superseding the original inconvenient localities. Nowhere has this necessity for better accommodation been more felt than in the metropolis, and nowhere, in consequence, have so many schemes, more or less to suit the public convenience, been set on foot. London is gradually becoming pierced in every direction; and the most novel means of transport, which has reduced the enormous cost of purchasing a site by invading the dominions of the rats, affords such an example of punctuality in its trains, and of comfort and even luxury in its carriages, as very much to make amends for the discomfort incident to its level.

In the exercise of their powers for the purchase of land, the metropolitan railway companies appear for the most part to have been actuated by a wise desire to avoid litigation. But while the owners of metropolitan property have been thus fairly dealt by, the case has been otherwise with reference to the occupiers. Premises occupied by the proprietors of long-established businesses have been bought and destroyed, and the occupier, to whom the position was everything, has been left to seek elsewhere for accommodation, or, in other words, to begin the world again, without any compensation for so great an injury.

It may not be in many instances that this has occurred, but the case of one may be the case of any, and there is not a retail tradesman of large business in London who is not deeply interested in preventing such an injustice. It was on this ground that Mr. Hughes opposed the second reading of a Metropolitan Railway Bill, and received, as the condition of withdrawing his opposition, the pledge of the insertion of a clause to provide for compensation in such cases. The attention of members and of those who return members, cannot be too scrupulously directed to the passage of this and of similar measures.

In a constitution of ancient growth, like our own, there may and must exist many anomalies, and many imperfections. Nor is it the habit of the English people to trouble themselves overmuch about that which may be theoretically imperfect, so long as it causes little practical inconvenience. Those who have given much attention to the subject are best aware how little the character of a representative assembly is affected by the form of the machinery that returns its members, and how much more a body, like the House of Commons, reflects the tone and the temper of the times than it does that of any individual constituencies. But chief among those time-honoured anomalies at which our children will wonder, is that of private legislation,—the barbarous, haphazard-manner in which laws affecting the whole empire are patched together, piecemeal, by individual members of both Houses of Parliament. It is generally admitted that hardly any Act of Parliament can be fully understood in all its bearings, even by the legal profession, until it has undergone the ordeal of the law courts, and until the judges have declared what were the intentions of the Legislature, and thus supplemented the crazy working of committees on Bills.

In such a state of legislative anarchy, the patient, careful watch of members who fear the result of hasty legislation, is of the utmost value. The respectability of representative institutions, and the immediate welfare of the country, are alike impaired when an interested or an ill-considered scheme is foisted through Parliament, or bungled and patched in committee. The best political augury will be drawn from indications that members of Parliament are aware that reform, like charity, should begin at home.

## ATTRACTIVE HOMES.

IT is only in the realms of fiction that we find very limited means habitually associated with attractive homes. In that bright land, however, it appears that poverty is a very hotbed for the rapid growth of a perception of the superior value of beauty of form and colour to that of costliness of material. No sooner does the lovely daughter of a banker, or speculative merchant, find that her parent's means have vanished, than she sets herself to beautify the humble cottage to which they are obliged to retreat, in the second volume of the novel in which her vicissitudes are related. The charms of the fine town mansion, a luxurious country-house, with equipages, plate, pictures, cabinets, velvet-pile carpets, damask hangings, and other household "effects," as the auctioneers have it, appear as nought compared to those gradually produced in the new home under the slight fingers of its mistress. Indeed, after considering the taste she displays, and the bewitching results she effects with but the expenditure of a few pence or shillings, as the case may be, we cannot wonder that the rich lover, whom she has magnanimously released from his engagement when she first hears of the alteration in her father's fortunes, admires her more than ever when he at last succeeds in finding the retreat to which she has studiously withheld all clue. If the heroine be already a wife, we find her, when suddenly deprived of the large income allotted her in the opening of the story, if possible, still more tenderly solicitous to make the new poor home attractive. We are led on, in fact, to feel that it is a prettier place and more desirable abode than the superbly furnished residence in which her lot and that of her husband were first cast. And when, at the close of the third volume, the exigencies of fiction require that their former wealth should accrue to them, it seems almost a harder fate to be reinstated in the favour of Fortune than it was to be deserted by that fickle lady. We have read of nieces and also of granddaughters effecting the same fairy-like beautifulness in the poor homes of the relatives with whom their lives were associated; therefore it is clear that it is not an exaltation of sentiment derived only from very exceptional circumstances that is alone capable of these costless successes in decoration. It is a recognised fact, in fiction, that a home need be neither ugly, squalid, nor gloomy, because the owner of it has a small income. In that fanciful kingdom price forms no component part of beauty; and the most consoling and gratifying results are effected, with the most trifling expenditure, by the simple unison of the heart, brain, and industry of the heroine.

What are the means at the disposal of these imaginary ladies? We glean from the narratives of their adventures that they have availed themselves principally of elegant forms, harmonious colouring, and orderly arrangement. To the scanty furniture collected, with these requisites in view, we generally find added some simple yet elegant home-made upholstery, a few drawings or prints, a musical instrument (the choice arbitrarily lying between a harp and a guitar), and a vase of fresh flowers. We note, too, that window decoration is frequently introduced, either by means of climbing plants trellised against the external walls, the leaves and loose sprays of which invariably patter against the panes, or of a few richly-coloured flowering-plants upon the window sills. The latter, by the way, are not unfrequently the means by which lovers trace out the hiding-places of their impoverished mistresses: we can call to mind at least three instances in which the particular selection of flowers cultivated in the window-sill has led to the identification and subsequent happiness of their owners. Nor is it the parlour only that is so pretty. Fiction delights in kitchens. The spotless hearth, with the favourite cat basking in the firelight; the flickering glow reflected in the array of pots and pans, all polished as so many helmets might have been in days of yore; the three-tiered dresser laden with rows of plates and lines of cups and jugs; the well-scoured table; the eight-day clock in the corner in its grave brown case, are pointed out, by those unveiling such sanctuaries, with the minuteness with which the possession of a priceless Flemish interior by a *grand-maître* would call attention to its details. Here order and cleanliness are the presiding genii. If the forms of the various metal vessels or the colours or designs of the ware displayed on the dresser would make any appreciable difference in the aspect of the picture, fiction-painters have not found out the secret. We are shown a ruddy glow, a clean floor, and an orderly arrangement of culinary vessels; and we accept the word-sketch as intensely suggestive of cosy comfort.

We are going to ask why these fascinating facilities for making the best of everything need belong only to fiction? Why can we not transfer to real life this power of making humble homes attractive? Of course something must be allowed for the previous cultivation of the dexterous decorators. But granting this, why should we agree to a general acquiescence in the belief that a house must be dismal and dowdy upon which no large outlay can be made, and that all charm and cheerfulness are a matter of money? Take away the harp or guitar, and there is yet a very different grouping of objects in these fictitious homes to that found in ninety-nine small houses out of a hundred. We should not be afflicted with the gaudy, sprawling-patterned Kidderminster carpet, the circular claw-table covered with oil-cloth, the hideous horse-hair bottomed mahogany chairs and stony-looking and stable-smelling sofa to match, the floriated fender before the fireplace, and the Rococo framed looking-glass above it, that we should be sure to find in the parlour of nearly every house in a row of small suburban houses. These doleful monstrosities are reserved for the flavouring of real life: no one alludes to them as fiction, doubtless from a feeling that they would be too oppressive to the great majority of readers, who look for agreeable entertainment at the hands of their authors. If we pursue our investigations into those homes where there is no circular claw-

table nor horse-hair and mahogany furniture, but where one room does duty for "parlour, kitchen, and all," the surface of things will appear still more dingy. We shall see, probably, a large turned-up bedstead made to look very much like a chest of drawers, and a chest of drawers which, consequently, bears a great resemblance to a turned-up bedstead. Both these articles are likely to be surmounted by tea-trays, on which Valentine subjects are depicted. It is scarcely probable that there will be a looking-glass over the mantel-piece here, but its place will be doubtless filled by a sampler, framed and flanked by a couple of black paper miniatures, or by a stuffed bird in a glass case, or by a coarse print varnished instead of glazed; and on the mantel-shelf we may expect to see a few flat-irons, and a brass candlestick or two, interspersed with crockery dogs, shells, a lucifer-box, and other oddments. The delf made so much of in a kitchen is stowed away, with the provisions, out of sight in a crowded cupboard, at the bottom of which there are generally saucepans, and often coal-dust. The centre of the room is unoccupied, the stateless chairs being ranged against the walls, and the sole small square or oblong table placed before the window. Dr. Syntax in search of the picturesque would have given up his task in despair if localities of such homes as these had been allotted to him as his field of operations. Yet such abodes,—the homes of thriving mechanics in full health and work (and the best of their class),—are to be counted by tens of thousands. Is it impossible to introduce in them the elements of attractiveness? The fair Alice or Eleanor of fiction would realize at a glance the blunt that would come to the keenest feelings if placed under the daily influence of a home so much the reverse of captivating. What can possess Mary Jane or Sarah Ann to take no steps to improve it?

We are not baying the moon, as admirers of the "divine Williams" might suppose. It is possible to make very pleasant homes in very unpromising places. There are few people but can number one or two such nooks within their experience. One would think it difficult to fix upon a more disagreeable place to live in than a mews, yet we remember to have met with as pretty a parlour, up a step-ladder, over a coach-house in a Mayfair-mews, as one would care to see. It is true that we learned that its occupants had seen better days and better quarters; but the fact of the possibility of making such an unpromising dwelling present a pleasing appearance remains. Lady Holland relates that Sidney Smith suggested patchwork as an inexpensive means of contributing towards the effective decoration of a house, and that she and her sister accordingly made patchwork window-blinds for their Yorkshire parsonage, which were the admiration of all who saw them; but let Mary Jane or Sarah Ann attempt patchwork, and instead of a mosaic-like pattern of pleasing design we are sure to see, at least in nineteen cases out of twenty, some higgledy-piggledy abomination that is suggestive only of rags and tatters. We do not say that they are to be blamed for being incapable of first-class artistic efforts without previous instruction; but they certainly ought to be pitied, and require to be assisted.

The assistance that we suggest should be offered consists of the exhibition of illustrations of different modes in which houses can be furnished artistically and comfortably for very small sums. We have seen the model cottages of the great Prince Consort at the first Exhibition; and we have seen the noble elaboration of the "idea" in the Peabody buildings present, and hope for a further development of it in those to come. We now submit that there can be but few objects we could show in our frequent exhibitions of art and industry more likely to be conducive to the comfort, cheerfulness, and health of a large proportion of the population than specimens of desirable "interiors" of houses for the working classes and people of small means. We allude, especially, to groups of furniture in which the greatest procurable amounts of comeliness, durability, and economy are combined, which, while pleasant to the eye would not be impossible or imprudent to the pocket of the educated mechanic about to set up housekeeping. One who was deemed wise in his generation endeavoured to inculcate a general conviction that the household goods of the labouring classes should be made of materials that would permit of their use by father, son, grandson, and great-grandson. To this end oak was recommended for tables, bedsteads, and stools; yew-tree, or oak, for chairs; and pewter and wood for plates, dishes, and mugs. Not "a miserable deal board," not a piece of crockery-ware, not a glass of any description, was to be seen in the cottage home of Cobbett's model labourer. Every item upon which his eye fell was to be strong and useful, and plain in its colour and form. We would improve upon this teaching. The proposition that a man should hand down his furniture to his descendants is, of course, admirable, but it is obscured by the difficulty of making one man's household goods serve, say, for his six sons and their families, as well as by the occasion he would have for the use of it himself for many years after his sons and daughters would require separate homes. To sit at the head of the same table at which his great-grandfather sat before him would be, doubtless, a source of constantly-recurring pleasure to many a mind; but as two great-grandsons of the same man could not do this, there are, clearly, great multitudes to be provided with household necessaries from some other source. On the other hand, there is so much golden hope enjoyed in the formation of a new home, such bright anticipations of the beatitudes of the new life to be led in it, so legitimate a field for the expression and gratification of individual tastes, that it is doubtful whether an absolutely new home is not preferable to an old one filled with retrospective associations. Of this, however, we are certain, we must take the old ones as we find them, but we can make the new ones exactly what we choose. To be more precise, every one can make the best he can out of the materials within his reach. Now we would extend the limited variety of possibilities within the means of persons with small incomes or with small savings made for the purpose. Instead of the second-hand piece of furniture, perhaps seized and sold for somebody else's rent, we would make it possible to purchase a new, graceful, durable object to serve the same object for the same money, or less. Most of our readers will be able to recall the hard choice that was presented to the youthful artist who wished to invest a shilling in water-colours before the Society of Arts called into existence the admirable box that can now be procured for that sum. We contend, that quite as great an improvement could be effected in cheap household furniture by the same competitive means, or the production of a sufficient demand.

We seem to have made many changes in modern furniture without much advancement. Surely we abandoned a useful plan when we left off making drawers to our tables, for they formed convenient and easily accessible places for the deposit of small articles. Those of our predecessors, too, must have been very unwise who banished the highly decorative dresser from the principal apartment in the house to the kitchen. As it is, the housewife who has any choice china keeps it locked up because she has no suitable place on which to display it out of reach of children. Again, why have we given up as altogether worthless the cunning device of box seats or benches? and why have we not introduced the *miserere*, or hinged seat, into our houses in such places, for instance, as window recesses? We do not seem to have improved in the economy and utilization of space in any perceptible degree; and yet, in towns, space is every day getting more and more valuable, and less likely than ever to fall to the lot of people with limited means. The great four-post bedstead, with its waste space below untidily occupied by boxes and lumber, remains the popular model of a bedstead still, as its imitation in iron and brass will testify. To divide this waste space into compartments, with drawers for the orderly disposal of the family possessions in the way of linen, &c., has not yet occurred to the upholsterers' mind. Nor is it likely to do so unless there be some special call made upon his contriving and inventive faculties. Thinking most of the small homes consisting of but one, two, or three rooms, we deplore neglect of opportunities to make the most of space. A sitting-room is scarcely worthy of the name that has not an arm-chair on each side of the hearth, but these need not be skeleton seats: they might be furnished with sliding wells or receptacles for the needlework or other private possessions of their respective owners.

We would remove the last century prejudices against every kind of wood but oak. The "miserable deal board" is in reality a very excellent article in its way. We were shown a short time since a bed-room fitted up by an earl for his own occasional occupation at the seaside, in which every piece of furniture, save the iron bedstead, was made of the white wood in question. Dressing-table, washstand, drawers, towel-rails, and chairs were as spotless as the crests of the waves beating on the shore, and the very height of cleanliness seemed attained. We do not, however, recommend deal in its natural tint for general use; for it is not our intention to dictate either the materials or forms of the improved furniture we think so desirable. We leave this to the different departments of the various trades concerned. Our share of the reform is the advocacy of its need,—an advocacy we have expressed for years; and the suggestion that the international and industrial exhibitions offer a grand opportunity for the education of millions in the matter of furnishing their homes so as to render them healthy, comfortable, and attractive. National habits being dissimilar, a Frenchman's idea of a model home would not be identical with that of an Englishman's; but there are so many people who would be more impressed with a lesson taught hundreds of miles from home, than that to be learnt next door to them, that we need scarcely consider the locality of the Exhibition. We may be well content if it is at the illustration of the world's progress to be shown us next year by the Emperor of the French, that we see chambers fitted up with artistical furniture at stated low prices. We would include in these "interiors" every appliance that would tend to lessen the labour of keeping such houses clean, as well as a few elegant, yet low-priced ornaments, to make them pleasant to the eye; and we would especially look to the general arrangement or disposition of the whole. In fine, we would give Mary Jane an opportunity of seeing the best way of furnishing a room with the ten or twenty pounds in hand, or in that of her intended; and we prophesy there would not be in future such a contrast between her home and that of her fictitious sisters reduced to similar circumstances.

## MESSRS. PHILLIPS'S PATENT GIRDERS.

FOR some time past several interesting experiments on rolled iron beams of peculiar construction have been progressing at Mr. Kirkaldy's works, Southwark, of which our readers may desire to have some particulars. Mr. Kirkaldy's machine (a patent), we may say at starting, is a beautiful work, from the foundry of Greenwood & Batley, of Leeds.

Several years have elapsed since the Continental architects and builders began the adoption of rolled iron beams in place of the ordinary wooden girders and joists, and found advantages in the substitution, not only in respect of cost, but also in the facility they obtained for working out conceptions which never could have had an actual existence under the old mode of construction.

Now, why have we not more generally adopted the use of so convenient a material as rolled iron? Years ago we suggested to the Government the offering of a large premium for improvements in the mode of rolling iron. The fact is that, with our practical habit of regarding things, the builder is popularly believed to be the best judge of what is necessary. He is supposed to be at least practical; and the opinions of such a one will tell with people, in spite of the representations of architects,—men specially educated to discriminate between the fitness and unfitness of things for the purpose intended. And so we find that, although every architect knows that cast-iron girders are really dearer than wrought-iron girders, inasmuch as they require more than double the weight to furnish equal strength, and even then that cast-iron girders cannot be relied on through defects inherent in their manufacture, yet at this very moment we may behold them placed in more than one costly erection progressing in the metropolis, introduced, we suppose, for some consideration for client's whim or builder's convenience. But, although it is a fair subject of inquiry why the use of rolled iron has not received more attention at our hands, it may be stated at the outset that the vast improvement of riveted plate joists and girders over any of the preceding kinds of cast-iron or wooden beams in use, and the facilities existing for their construction, justified their retention till it could be demonstrated that a better thing was at hand to replace them.

Few departments of engineering have had the benefit of actual experiments to the same extent as this one of girder construction. Witness the

labours of Professor Hodgkinson, Mr. Fairbairn, and others; yet, till recently, we were without any definite knowledge of the properties of the rolled beams and their combinations. Mr. Homan, while engaged in making a series of tests for the purpose of obtaining reliable data in practice, noticed the tendency of all these beams to yield laterally before their full resistance was developed, and sought to obtain the required lateral resistance by riveting a plate on the top flange. Every previous experiment showed that, by supporting the beam back and front in such a manner that it could only yield vertically, the load might be increased 40 per cent. Thus a beam 8 in. deep, with flanges of 2½ in. placed on supports 20 ft. apart, sustained about 4 tons on the centre before yielding sideways and becoming crippled; while the same beam "cradled," or supported laterally, took 5½ tons before breaking. After the plate had been riveted on the top flange, the same kind of beam took 7 tons without showing the slightest fracture, and merely exhibiting a considerable set vertically. Other results were obtained equally striking. By doubling the depth of a beam, we double the resistance, other things being equal; and so when increased strength beyond that furnished by one beam was required, it was usual to place two together, either alongside or on each other; for example, if one beam were equal to 4 tons, two beams were equal to 8 tons, and experiment showed that such was actually the case. Two of these beams, 8 and 2½, were therefore riveted together one upon the other, and the lateral deflection was sought to be remedied as before by riveting a plate 8 in. wide by 3-8ths thick on the top flange. The beam now formed was 16 in. deep, and it was expected to be equal to 10 tons on the centre, when placed as before on supports 20 ft. apart. On applying the strain it was found that 16 tons produced no sensible set, and at 20 tons the beam failed only by lateral twisting, the iron being sound and uninjured. Here, then, was a novelty. We have examined the various authorities on this subject of beams, and have conversed with several persons who have had great experience in designing girders, without finding any notice or previous knowledge of this singular result; indeed, it is useless to attempt to understand the properties of these girders on any ordinary hypothesis. The real explanation probably lies in the fact that the web plate, usually considered as not contributing to the strength of the riveted plate girders by reason of the attachment to the flanges being merely mechanical, actually enters into the work of the patent girder, united as it is to the flanges by the superior attachment of the natural cohesion of the metal. Taking, then, the web of these girders as forming an important element in their ultimate resistance, we are able to understand and accept as probable what would otherwise appear extraordinary. In order to arrive at their relative value, compared with the ordinary riveted beam, we will apply the well-known formula of Mr. Fairbairn, $W = \frac{adc}{l}$, where W = weight, A = area of lower flange, D = depth of girder, L = length, and C is a constant, the value of which depends on the form of beam and must be ascertained by experiment; whence it follows that the higher the value of C, the greater the value of the beam for the same sectional area. A simple web plate, with angle-iron on top and bottom, gives a constant of 60; an additional plate on the top and bottom flanges increases it to 75; that is, the strength of the girder is increased in that ratio. A box beam or cellular girder gives a constant of 80, and these respective values are singularly correct when applied to ordinary iron and workmanship; if any deviation is found the cause exists in altered conditions, whether in the quality of the metal or workmanship. We use this formula because it is based on actual experiments, and for years has stood the test of practice; moreover, we understand that it applies with great consistency to the new form of girder. We have said that Mr. Fairbairn's experiments established the values of riveted girders at 60, 75, and 80, the difference depending on their form. The rolled beams made by the Butterly Company give 57 to 88 as constants; the tests we have seen applied to the Belgium beams give higher results; but the difference probably depends on the fact, that the flanges were smaller, and the distribution of the metal such as to enable a larger amount of work to be done in proportion to the sectional area.

Among the experiments recently made at Mr. Kirkaldy's works, we will take two, as best illustrating the subject, and will compare them with the given results of riveted plate girders of corresponding sectional area, and consequently of a like weight per foot run. A rolled beam, 8 in. deep, with lower flange of 2½ in., and with a plate 6 in. by ⅜ in., riveted on top flange, the whole weighing 22 lb. per foot run, was placed on the machine at 20 ft. distance between the supports. Now, if we had to design a riveted plate beam of corresponding weight, and if we were seeking the best distribution of the parts with the view of obtaining the greatest amount of strength, we should make the web-plate 9 in. by ¼ in. thick, the bottom angles 2 in. by 2 in. and $\frac{9}{16}$ in. thick, and the top angles heavier, to equalize the compressive strain of the top flange with the tensile strain of the lower flange, say, 2 in. by 2 in. and $\frac{5}{16}$ in. thick. Such beam, weighing 22 lb. per foot run, would break with about 3½ tons applied on the centre, with a span of 20 ft. A strain of 4 tons was at once applied on the centre of the patent beam, and after a short time withdrawn, without any appreciable set; 5 tons were then applied, and on being withdrawn a set to the extent of $\frac{3}{16}$ in. was found to have taken place. The load was then increased to 6 tons and 7 tons, the set increasing to 4 in., but without the least fracture or injury to the beam beyond the set in the centre. If we now apply the formula to find the constant, taking area of flange at 1 in., we have $C = \frac{wl}{ad} = \frac{7 \times 240}{1 \times 8} = \frac{1680}{8} = 210$, and this figure indicates the value of the constant in the formula $W = \frac{adc}{l}$. The second illustration presented was a girder formed of two similar beams, of 8 in. depth by 2½ in. width of flange, riveted together, with a plate on the top flange of 8 in. width by ⅜ in. thickness, the whole weighing 40 lb. per foot run.

For a corresponding sectional area of ordinary riveted girder, we may take a web-plate of 12 in., with bottom angle-irons of 3 in. by ¼ in. thick, and top angles of 3 in. by ½ in. thick, to equalize the strains as before, such a girder would weigh 40 lb. per foot run, and would break with 9 tons applied on the centre. The patent girder was placed at 20 ft. between supports, like the first, and 10 tons weight applied on the centre, without even a perceptible deflection, although the delicate register of the testing machine showed deflection, and even set, in an infinitely small degree, when the weight was removed. The weight was then increased successively to 12, 14, and 16 tons, the set registered at this last weight being ¼ in., and ultimately increased to 20 tons, when signs of yielding by compression were apparent near the upper part of the web-plate. On attempting to increase the strain it became evident that the girder could not be broken, although by twisting a severe crippling might result. Again applying the formula to ascertain the constant, $C = \frac{wl}{ad} = \frac{20 \times 240}{1 \times 16} = \frac{4800}{16} = 300$, we obtain a constant of 300, against the riveted beam of similar sectional area taken at 75.

The profession will probably desire to see some of these girders tried against girders of the old forms, made of similar iron, and under the same machine, before they admit a great superiority. Enough, however, has certainly been shown to encourage the Messrs. Phillips to persevere in bringing the invention prominently before the public.

## STREET ARCHITECTURE IN LIVERPOOL AND ELSEWHERE.

IN itself a design may be good; and yet, considered in reference to its surroundings, it is quite possible for it to be ineffective and out of place. And, to draw a parallel, an individual may be upright,—we always assume that *buildings* will be,—honest, and worthy; but, with all these good qualities, it is quite possible, from an inattention to, or want of consideration for, others, or the rules of polite society, he may be thought offensive and bearish. There is such a thing as a gentlemanly building—a building that does not wrap itself up in its own importance, or crow over and jostle all the other buildings in the same street; or, in a misanthropic spirit, being continually engaged in introspection, set at defiance public opinion, and reserve all its favours for those only who have the key of the portal. A man may, in a measure, be known by the house he builds, as well as by the company he keeps; and the bearish spirit says, "What the d——e have the public to do with me? I'll make the outside like a box, plain as a pikestaff, with square holes shoved through." The flashy man is known by the gin-palace character of the decoration; and, as in real life, he who simply snarls Mrs. Grundy a defiance, usually possesses more sterling merit than the man of banners and tin trumpets, flourishing the one and blowing the other, specially in the face and ears of his own particular friends, and generally for the benefit of what is known as the public.

In the shop architecture it is that the modern spirit of flash holds high revel. Why shops should be specially devoted to bad taste is to us a mystery. In public-houses the case is different: association of ideas is alone sufficient to produce it. Though, again, in the old time, hostelries were tasteful buildings; but then, hostelries were respectable institutions, — public-houses, the homes of those who *do* beers or do worse. A good, tasteful shop is a want in Liverpool and in most other places. It seems as if the counter prescribed the taste; indeed, to so low an ebb has art-feeling come, that every one but the architect does prescribe the taste. We recollect well ourselves holding the opinion that there was a style for everything—a style for public buildings, a style for shops, a style for villas, a style for public-houses—the most luminous reasons being given for particular choice. Well, this is an idea acted upon by our architects, and acquiesced in by the public, until this day. How the notion arose is obvious to any one who has studied modern art—not its rise and fall—for never having risen, it never could fall. Since the Cinque-cento period, when the spirit of revival took the place of genuine art creation, the world has seen the dead bones of antiquity dug up and reburied—reburied and dug up—as if we were searching for the remains of some lost friend; and, being unable to establish his identity, had kept turning him over and over in a half-dubious frame of mind, never knowing with certainty what we had really dropped upon. The language of classic art being very limited, suited well the capacities of those content to copy, for its grammar could be mastered with little effort; but the human mind, unfortunately for those of a contented disposition, will not consent to stand still. It is a machine that must always be in motion: if it cannot move forward it must move backward; and, when it has no real materials to work upon, goes grinding itself to pieces on memories. People could not long remain contented with the Renaissance, the high-sounding title given to the works of the great Italian masters. Michelangelo and Raffaelle were pure artists—not builder artists, like the workmen who preceded them, and consequently did not establish their style upon structural principles; and, though their works often possessed great qualities, the style possessed not the elements of growth and development within itself. It was born at once into full maturity, and did not pass through the natural stages so necessary for the perfect development of anything good and great. The dullest people tire of repetition; and, upon the unearthing of any forgotten remains of antiquity, what was called a new style arose. So unpliant were all these antique packing-cases found to be, that, though they suited, in a measure, one particular purpose more than another, they could not, without distortion and rending, be fitted to contain everything that had to be thrust into them. Thus it came about that the Temple or Columnar style could be more easily fitted to public buildings; and, by the aid of judicious dodging and concealment, be made to convey somewhat of the impression of those grand old monuments of Greece and Rome, the Parthenon or the Pantheon. It seems to us almost a waste of words to argue against such a low method; yet, as the world has shown, it is actually necessary to do so. We do not want either Classic or Gothic, as generally understood: we want an effective architecture, carried out upon true and honest principles; and it happens that such architecture would be economical and beneficial, both intellectually and morally. The greater part of the world seem content to live as if they possessed only one or two faculties, and a genuine love of the beautiful, for itself, is an exceptional phenomenon, to be prized when met with.

To obtain ideas for an effective system of street architecture it is not necessary to go very far.

The study of a few of Prout's views on the Continent would supply materials to a practically imaginative mind, which could, with the suggestions which always arise in the proper planning of a house, be made to yield a far superior quality of work to that we generally see. We have a few of his views at present on the table. One is a street in Nuremberg. There are a few projections in the form of bay-windows shown; but this is not what catches the eye, and gives character to the architecture. On the contrary, the several buildings are lineable and flush, as they ought generally to be in good street architecture. It is apparent the houses have been built at different periods: they are distinct and individual in character, and evidently, not being subject to Corporate restrictions or designed by Corporate surveyors, rise to different heights, and are very irregular in the levels of the floors and windows. This is quite unorthodox; and if they were in Liverpool we assume they would soon be pulled down. The detail is generally very bad; but the grouping possesses the essence of the picturesque. The first house presents a large-gabled dormer corbelled out into the street; the second has a dormer with a conical roof; the third, a hipped octagon dormer projecting like a hood, and so on, ending with a house with a hooded roof, very simple and effective. There is no striving after effect. Each man has followed his own taste, but adopted the same principle of design. In fact, the motive was the offshoot of the age, not the man. Thus we see a telling outline in the street, though all the houses or shops are perfectly flush on the face—the breaks being vertical as they should be. Our architects seem quite unaware of the value of a vertical break, but always seem striving to throw the plan into fantastic forms that prove in every way injurious to breadth of effect. We have said the details of these buildings are in themselves bad; but this need not prevent us profiting by the valuable hints they afford. The view in Caen also shows that a building may be eminently picturesque, yet with detail of the most Rococo character. Contrary to our designedly picturesque buildings, in which bad detail is combined with the most artificial distribution of the masses, these Continental streets seem to assume picturesque forms of themselves, as crystals, in cooling, assume their shape and character. There is another view of Prout's, in Rouen, perhaps more picturesque than any we have mentioned, and more decidedly Gothic. There is a greater variety in the heights of the buildings—prominent eaves, different pitches of roof, varied dormers and chimneys. Where one building rises above another it does not disclose an unfinished bare wall, but is broken up and diversified by the perspective of the dormers and roof immediately before it. They all seem to be complete buildings in themselves, not detached fronts stuck on. You might argue from now to doomsday with the orthodox architect, and he would not believe it possible to do anything better than what we see every day; and it is a curious phenomenon, showing the state of form-blindness to which people may arrive who ought to know better—who ought to feel enthusiasm for their profession—that nearly all Liverpool architects think Liverpool one of the most beautiful places on God's earth. We pity such distorted patriotism; and, as we love our town, we wish to improve it, and raise it to its proper art position. We verily believe the architects are more to blame than the public. No one who practises street architecture seems imbued with a healthy feeling. Could anything contrast more strongly with the plain, simple, unpretending dormers of Rouen and Nuremberg than the disgustingly-formal and ill-designed dormers of Henderson's shop and the Basnett-street front of the old Compton House, which an over-enthusiastic reporter described as "a magnificent arcaded front." Presumedly picturesque forms dressed in discarded classic livery, are worse than the most level commonplace, for the ornamental vulgar is a depth decidedly lower than any sort of commonplace. What a field for the beautiful lies in the space about St. Peter's Church! But what do we meet with? Facing us, on the east side, is what builders call a Gothic job, than which there is nothing more execrable, though expensive, to be found in the town. There is the Blue Coat School, perhaps the most respectable-looking of the lot; but as regards art, *nil*. Then there is the New Bank, rising up above everything in all its majestic ugliness. Then there are Wilmer's-buildings,—a warehouse front,—not to be despised on that account; but, as far as the little attempt at ornamentation goes, as bad as any. A few moulded bricks would have been better than the little bit of cement work. On the west side is a more ambitious attempt at coloured brickwork; but there is an entire absence of feeling; and, on the north side, the best thing to be seen artistically is the void where Compton House used to be. Of St. Peter's Church it is unnecessary to say anything: all seem to know that is bad. Now, imagine all this destroyed; the church replaced with even a square brick tower like that of St. James-the-Less in London, by Street; the Gothic *job* by the Insurance Office opposite the Bank of England, in Manchester, the work of Waterhouse; the coloured brick building by something more in the style of Pugin's Priests' College at Rock Ferry. Imagine the Bank to be like many of the buildings erected by Deane and Woodward; or like that in Dublin, designed by Digby Wyatt, and illustrated in the *Builder* some time since: Willmer's-buildings, with moulded brick reveals and coloured brick surface decorations, brick corbelled eaves or parapet and splayed arches, and instead of skylights, buttressed dormers, such as Murray delighted in: imagine,—and this is the most difficult to do,—a range of shops on the north side of Church-street, designed in the spirit of Jacques Cœur's House at Bourges, which any one may see by peeping into Norman Shaw's interesting "Sketches on the Continent." "All this is very fine," we hear our old hands exclaiming; "but it won't do." Won't it, though?—Just try! The experiment should be made: the crucibles, retorts, and chemicals are all ready, and we only want the manipulation of the chemist to bring out the refined gold. If the amalgam of the architect's mind should, when the ore has been reduced, extract the precious metal, the reign of beauty would commence.

LIVERPOOL.

## A MODEL CITY IN 1916.

AT the last meeting of the Liverpool Architectural Society (Mr. J. Boult in the chair), a paper by Mr. S. Huggins was read, entitled,—"Letters from the New Capital of Australia, by Scammozzi Smith, architect; written to his friends in London during the summer and autumn of 1916." It was chiefly descriptive of the architectural features of an imaginary future capital of Australia—a great empire supposed to be developed out of our colonies in that country. The constitution was represented as that species of limited monarchy which is most correctly characterised as an idealisation of our own—our own British constitution corrected and purified to the utmost. The aristocracy is an aristocracy of intellect, not of birth, elevation to the peerage being the reward exclusively of eminent service to society—not in law, war, or politics only, but in any branch of art, of science, or of literature. A full description was given of the magnificent city, the architectural beauties of which have attracted to it a party of English architects and their friends, of whom the supposed writer of the letters is one. They approach it by water and land, on the central or municipal quarter, which is an island, and there learn that, by the river which flows round it, and a canal, both of which are spanned by numerous bridges, the whole city is formed into five departments, all separated from each other by water. They are appropriated as follows:—The centre is the department of the local government of the city; the north quarter is devoted to commerce; the east is the trade quarter; the south is the aristocratic or palatial quarter; the west is the literary or collegiate quarter. Besides these, which properly belong to the city, there is the isolated quarter without the walls on the south side, appropriated as the seat of government and legislature, containing the houses of Parliament and all government offices. A magnificent road conducts to it. A peculiarity of the trade quarter is that the trading streets, all of which are placed in its centre, are formed on the Chester-row principle—an arrangement greatly contributing to artistic beauty, and securing deep shadow to the front, so much wanting in the shop-fronts of old England. In the aristocratic quarter no shop, workshop, office, or place of business of any kind is allowed to show itself; and no house is to be built below a certain size and value per annum, regulations submitted to cheerfully by all classes, under the conviction that it is essential to the making Shakesperia what all desire it should be, a uniformly beautiful city. Some of the finest buildings in the collegiate quarter are the palaces of the poets, artists, philosophers, and literati; where men who have achieved a certain rank in any liberal pursuit are honourably lodged, receiving apartments for themselves and families, with a certain stipend annexed to them; for which they are not expected to do anything in return "that," to use the words of W. S. Lander, "they may not incline, nor be obligated to any vile or lowly occupation;" that the lamp of literature and genius may ever be kept alive, and that there may be ever in the land a succession of those heirs of fame. The general principle of street arrangement in the different departments of the city is this:—From a grand central and circular place or open area, the main streets, eight in number, of great width and making equal angles with each other, radiate to the extremities of the district, terminating either in the river or at the wall, through which they pass by a gateway to the suburbs. These radiating streets are crossed by a series of fine concentric ones, which, however, are not repeated to the extremities, but give place to subordinate systems of radiation from centres on a smaller scale, the radiating lines of which variously terminate in those of the larger, in the last of the great concentric streets, or at the river wall. The great radiating lines are noble avenues, which bring the healthful breeze into and thoroughly ventilate the city. But nowhere is the country—that is to say, nature—crowded out. It pervades the city to its very centre; which it is the better enabled to do by the absence of everything that could contaminate the air. Round all public buildings and at the intersection of most of the great streets ample areas are provided whose grass and shrubs refresh the eye. The public park or garden is described, and also the public cemetery, which are both represented as truly artistic features of the neighbourhood. They are profusely decorated with high-class sculpture; on mention of which the writer takes occasion to remark that nothing had given him a higher idea of the pure taste and intellectuality of the people than their fondness for, and extensive employment of, the art of sculpture, which he conceived to be more abstract, spiritual, and ideal than her sister art of painting. Though in solid material, it was so unlike the body, the mere form of which it imitated—so calm, so pure—that it would stand for a portrait of the soul rather than of the body, as such a high-class statue seemed to him to be the divinest work of man's hand; in saying which he was not placing sculpture above poetry, which was a direct communication of soul with soul without the intervention of manual labour or skill. The writer attributed the extraordinary success of the people in art to the prevalence among them generally of a clearer idea of the proper end and aim of human life. It was perceived that wealth and happiness are not identical; that money is but a very subordinate means of attaining to that *summum bonum* of life. Wealth was sought with diligence, but it was generally sought and used as a means of obtaining something higher—something more nearly allied, and more immediately conducing, to happiness—as health, leisure for self-culture, acquisition of knowledge, and cultivation of the intellectual and moral faculties; the power of diffusing education, of advancing the arts and sciences, drying the tears of sorrow and distress, and promoting the higher and lasting interests of humanity. They pursue knowledge for its own sake and its ennobling influences; and the ardent love of it that is engendered has naturally led to the more general and uniform cultivation of the intellect—that is, of the entire intellect—among all classes, by which all the mental faculties are more or less brought into play, and by which are constantly produced that rare balance of imagination and the reasoning powers in which the perfection of the human intellect will be found to consist.

ST. NICHOLAS'S CHURCH STEEPLE, NEWCASTLE-UPON-TYNE.—Another attempt to obtain funds for the restoration of this ill-used steeple is now being made; a public meeting having been held in the church vestry, the vicar in the chair, when a subscription was resolved upon to raise the two or three thousand pounds requisite, beginning with the 500*l.* offered by the Corporation, and the 200*l.* offered by the Churchwardens, together with a few smaller sums promised at the meeting. It is to be hoped this last resource will not prove abortive like so many previous attempts to get through with this small affair.

## ITALIAN NOTES.

THE long-talked-of project for the enlargement and improvement of Florence has at last assumed more definite form to the public apprehension, at least as a project, through the printed report of the Syndic to the "Giunta Communale," or municipal council, and the total estimate, 34,580,000 francs, does not seem excessive, considering all that is contemplated. Among the several plans announced, only one, applicable to a particular quarter, is yet positively approved. Much is aimed at in the way of embellishing, opening street lines, and adding to the public convenience or safety; as (with the former object) the new approach to the Pitti Palace, the new laying out of the Cascine park, &c. In the latter objects, the works for protection against inundations, so frequent and often disastrous in Florence; the aqueduct, a great desideratum, for bringing water from the mountains into the city's heart (estimate, seven million francs); the building of a great market for all comestibles; the widening of the Ponte alle Grazie, oldest of the bridges over the Arno, and indeed one of the most ancient structures in Florence, founded 1237. And among projects affecting edifices of monumental character, is one for additions to the senate-house, in the Uffizi; another for adapting to present uses the Communal Palace, a fine old castellated building of the thirteenth century, ascribed to Arnolfo del Cambio. Most important, as it may affect the city's aspect at a chief centre, is the plan for a new "Lung' Arno," or extent of quays on the river's left bank, to be carried westward from the old towered gateway, Porta S. Niccolo, at the extreme eastern point on that side, involving the necessity of sweeping away certain clusters of irregular picturesquely-piled old houses that rise immediately out of the water, and add a striking feature to that most beautiful scene presented by Florence and her mountain background from the actual quays on the Arno's right bank. We observe that in this report a certain number of projects are classed together as secondary, others as primary in importance; the estimates for the former, which are of high amount, not included in the 34½ millions of indispensable outlay.

Other lately published statistics that supply notes for our pages relate to the Italian universities and other schools supported by Government. From these pages we learn that in the Schools of Fine Art the number of posts of Royal foundation is at present 225, only two being of private foundation; the annual subvention for Schools of Painting, Sculpture, and Architecture, 46,563 francs; for that of Engraving on Copper, 2,428 francs; for that of Music, 79,178 francs; over and above which outlay are the several pensions to students of narrow means, mostly at 30 francs per month, and of number not determined: in the total but a small expenditure for such interests on the part of a Government charged with the destinies of the *par excellence* land of the arts in Europe! Not the less is it true, however—and we have frequently had to mention facts relevant to this,—that in the interests of public monuments and promotion of artistic objects, what this Government has done, and is now aiming at, may be pronounced worthy of its position and antecedents, indeed beyond all that might be expected when we remember its financial embarrassments. It is well known how, after a faint struggle to defend the standard of the Tiara, the city of Orvieto was transferred from Papal possession to the Italian monarchy. At that time works were found initiated, and to some degree carried out, on the façade of the glorious Duomo, the pride and marvel of that otherwise obscure place; and so far from allowing such undertaking to languish, this Government has since promoted it vigorously; so that as well the more ancient frescoes of the interior as the complicated bas-reliefs on the façade are now renewed, or in course of being so, wherever time had inflicted injury. We had a glimpse of these works when *en route* at Orvieto on a journey in the summer of '64; and have just learnt from a recent visitor that they are still in steady progress, directed with intelligence and taste, a report conformable to our own impression during a brief study of the marvellous building on our last visit to it. Those elaborate reliefs, illustrating the entire story of Revealed Religion down to the Last Judgment, its dread and final scene, are the work of different artists, of early date in the fourteenth century, and the greater number have been ascribed by Italian critics to Fra Guglielmo Agnelli, a pupil of Niccolo Pisano, who was engaged at Orvieto up to the year 1304. In the same manner has this Government succeeded to another, and worthily carried out what that other had initiated, in the works at Milan Cathedral; and we might add to the list of its undertakings in this line the restorations of S. Eustorgio in that city, and those in progress at the Arezzo Duomo. Turning to Florence, we have indeed cause to deplore the non-fulfilment in respect to the long-promised façade of her Duomo, the subscription towards which, that had realized a not inconsiderable amount, being now at a stand-still, and as far as we are informed, the feeling now prevalent is that nothing more should be given till the public receive some guarantee that the undertaking is really in advancement, has become a tangible certainty, and that one of the numerous designs exhibited, season after season, has been chosen for accomplishment. When this subscription was first set on foot, contributors were given to understand that by the end of six years all would be ready, at least for the builders' labourers to commence: a much longer interval has elapsed since then; a dynasty has fallen and been replaced by another; but beyond the ceremony of laying the first stone, no other stone of the sacred structure has yet been set up. It is but fair to the committee responsible, however, to take notice of their arrangement, that those who desire may be at liberty to withdraw the sums contributed.*

At Genoa has been opened a competition of architects for a new façade and new elevation at another side of the Annunziata, that superb church which presents all the splendour of the modern Italian decorative style. Designs are to be given in before the 30th of April next, and the two most approved to be rewarded with prizes of 3,000 and 1,200 francs; also a lower prize, to be bestowed for any composition that might be chosen, though not answering to the highest theoretic requirements,—rather a singular provision! The Tuscan Academy of Art and Manufacture has taken steps towards securing a worthy representation for Italy in the Great Exhibition of this year at Paris; providing that in each province the most remarkable productions, both natural and artistic, should be sought after, and reported upon by long committees; juries appointed to determine the choice of what is most commendable; and after this ordeal, selections finally made among all objects brought under consideration,—a method well devised, but requiring very complex organization. The question has been proposed by Government to this academy, whether a bronze cast of the "David" of Michelangelo should be erected in the largest hall of the "Pretorio," among the objects there classified as a Mediæval museum; and the directors reply by advising that a plaster of that statue should first be set up in the destined place, in order that effect may be estimated before a final decision is passed. The bronze in question was executed, a few weeks ago, at the Royal Foundry here, under the direction of Papi, a well-known artist in this walk, and with signal success. The journals announced it as a public event; and an account of the occasion in print might have reminded of Benvenuto Cellini's memoirs, telling, as it did, of the religious earnestness with which all hands were applied to the task, the prayerful ejaculations, and the thankful joy at the prosperous issue. In one hall of that museum at the Pretoria, we see the frescoes of Andrea del Castagno, transferred from the Pandolfini Villa at Legnaia, and for a time left in a magazine on the Uffizi premises, where they were seen by Messrs. Crowe & Cavalcaselle, who gave an intelligent critique on this curious series, which consists of colossal figures, historic and ideal,—Dante, Petrarch, Boccaccio, Farinata, Acciaiuoli (the Seneschal of Naples, and founder of the Certosa, near Florence), Esther, Tomiris, the Cumæan Sibyl,—characterized by that sinister and sombre aspect peculiar to this artist's creations, but with a vigour and originality that entitle them to class among his best: stern and stately, they look like forms which, by torch-light or moonlight, would become spectral to a degree terrific. We are glad to be now persuaded (thanks mainly to those writers on art history) that their artist was *not* the assassin of his co-labourer, Dominico Veneziano. We still hear of the honours paid to the memory of Massimo d'Azeglio, of a monument in the Campo Santo decreed by deliberation of the magistracy at Pisa, of an exhibition of all obtainable pictures by his hand (and on the canvas the illustrious statesman displayed no common skill) at the Carignano Palace, the former Parliament-house, in Turin. The Society for Dramatic Encouragement at Florence has offered 1,000 francs for the ablest "Essay on the Italian Theatre;" the same society, by which prizes are annually bestowed for the best original tragedies and comedies successfully produced on the stage, but which, in the last instance, pronounced that none of those submitted to its judgment were found deserving of such honours.

* We have engraved, and shall shortly publish, a view of the design selected as the best in the last competition.

## THE YORKSHIRE FINE ART AND INDUSTRIAL EXHIBITION BUILDING.

THE site question has been decided and progress is being made with preliminaries to the opening on 1st of July. The drawings of the building have been so far completed that, along with the specifications, they have been on view at the office of Mr. Taylor, of York, architect. The area which the building will occupy will be about an acre and a half. The principal feature will be a central hall 200 ft. long by 80 ft. wide, which will be divided into a nave 50 ft. wide and a couple of aisles each 15 ft. in width. There will also be a projecting gallery, 18 ft. wide, entirely round the large hall, access to which will be gained by four wide staircases,—one at each corner. The nave of the central hall will be divided into fourteen longitudinal compartments, with semi-circular arched ribs 50 ft. high, and supporting a lantern skylight in which ventilation will be provided. Five large windows will also give access to light at each end, and skylights will be carried along the whole extent of the aisles of the nave. In the central hall, aisles, and gallery it is proposed to display the principal objects of attraction. On one side of the central hall will be the picture galleries, which will consist of five rooms, two of them 60 ft. by 30 ft., two 40 ft. square, and one 85 ft. by 30 ft. The building will stand back from the palisades in the front of Bootham Field about 150 ft., and will present a frontage of 300 ft. or thereabouts. As to the external features in the elevation towards Bootham the principal object will be the gable of the large tower, which will rise in the centre with a clock-turret to the height of 90 ft. The picture galleries and rooms for the exhibition of curiosities will extend on each side of this and terminate at each end with a conical-roofed building, forming a kind of tower. The building will be framed of wood throughout, which in the front elevation will be dressed, and the whole of the roofing will be covered with felt.

## PYRAMID GEOMETRY.

IT is quite conceivable that, in these days o "Egyptology" rampant, and claims for inspired inches, gallons, and chaldrons,—which, according to the *Saturday Review*, have driven no "undevout astronomer," but even a Scottish Astronomer Royal, mad, — many readers of Herodotus without notes might, on making the discovery which Mr. Thurnell explains in the *Builder*, claim it, like him, as a novelty. But I certainly cannot imagine how he could do so after reading the late Mr. Taylor's extraordinary production (probably a heavy attempt at a satire on Egyptology, which it well deserves). Without having read that work, or ever intending to read it, I find, on opening it at random, these passages, p. 296:—"He [Herodotus] says that each face of the Pyramid is equal to the square of the height. Now, this is true, when the angle of the face" [with the ground] "is equal to 51° 49′ 46″." Appendix, p. 32, quoting Herodotus,—"four-sided, each face, on every side, is eight plethra, and the height is equal." . . . . "In the content of each face are eight plethra, and in the content of the square of the height are eight plethra. The angle required to make the square of the height = the content of each face is 51° 49′ 46″." This repeated angle, by the way, Mr. Taylor calculated too much by 8 seconds; and both Sir J. Herschel and Professor Piazzi Smyth, copying the above figures, have reasoned on them as correct to seconds. Mr. Thurnell, has given the true value, 51° 49′ 38·3″. It is the angle of the only right-angled triangle that can have its sides in *geometrical* progression; just as the

triangle of 3, 4, and 5 is the only one having them in *arithmetical* progression.

Sir John Herschel, writing to the *Athenæum*, April 23, 1860, after noticing Taylor's original suggestion, that the circumference of base was meant to be to the height as the circumference of a circle to its radius, says the mean of Perring's and Brettel's measures of casing-stone angle is 51° 51′ 8″, and this "differs by *only a single second* from the angle whose cotangent is the length of an arc of 45°;" that is, from the angle Taylor's new theory requires. Professor Smyth, by the way, in the *Edinburgh Transactions*, 1864, p. 672, gives this same angle as 51° 51′ 14·3″. Cannot the two greatest authorities get within 6″ of each other? Sir John then proceeds thus: "By a very remarkable coincidence, which Mr. Taylor has the merit of having pointed out, the same slope, or one practically undistinguishable from it (51° 49′ 46″)"—[he should have said 38″]—"belongs to a pyramid characterized by the property of having each of its faces = the square described upon its height. This is the characteristic relation which Herodotus distinctly tells us it was the intention of its builders that it should embody, and which we now know that it did embody, in a manner quite as creditable to their workmanship as the solution of such a problem was to their geometry. This problem, however, has no relation to that of the rectification of the circle. The coincidence is one as purely accidental as anything relating to abstract number can be; and although, in solving the one problem, which we know they did intend, they at the same time, practically speaking, resolved another, which stands in no rational connexion with it, or any connexion beyond happening to have, very approximately, the same numerical solution,—we are not entitled to conclude that they were aware of this coincidence, and intending to embody *both* results in their building." Not only so, but I hope presently to make it clear, sir, that we are as yet very far from entitled to conclude that the pyramid builder was aware of, or meant to embody *either*; nor have we a shadow of proof, however creditable their workmanship, that the geometry of either the pyramid builders or any Egyptian of Herodotus's time was adequate to solving this problem,—a case of the eleventh of Euclid's Second Book.

That Herodotus and his guides meant what both Taylor and your correspondent have understood him to mean, has never been doubted, I suppose, by his annotators, for centuries past. His words are doubtless very elliptical, and apt to convey at first sight, to modern readers, the false notion that the *plethron*, instead of an acre, was a long measure, eight of which went to each side of the pyramid's plan, and eight also to its height, in some sense, either vertical or along the face or edge. No one who had seen the rudest sketch of any Egyptian pyramid could suppose this applied to any but the last kind of height, that measured along the edge; and even this would give a proportion very boldly and conspicuously steeper than any pyramid in Egypt. It would give, probably, the only form of pyramid likely to be built in any other country (that of Caius Cestius, for instance), for it would give the most symmetrical and commonest one in nature; half a regular octohedron, as a crystal of alum, of fluor, and of innumerable common minerals; one in which the five points would touch a circumscribed hemisphere, the vertical height equal the semi-diagonal, the opposite edges meet at a right angle, and every angle between any two adjacent lines be 60°. But when Mr. Fergusson tells us in his "Handbook of Architecture," p. 218, "The most plausible theory seems to be that, the faces of the pyramids were intended to be *practically* four equilateral triangles laid against one another," and that "with any other people than the Egyptians this might be considered a sufficient explanation. . . . . But the Egyptians were such excellent mathematicians, and such perfect builders in those times," readers must be puzzled to know what he calls perfect building. Every tyro knows that the faces of the above-described *natural* form, must be inclined to the base only a quarter of a degree less than 55°,—strictly 54° 44′ 8″,"—and surely there is no race in the world, building so badly, either in stone or wood, that if they meant "practically" to produce the above form, they would, in some twenty different trials, make the angle that should be a quarter short of 55°, always between 51° and 52½° in every case!

A change of a degree, be it observed, in the inclination of the Great Pyramid's face, requires above 26 ft. in the vertical height, or else above 40 ft. in the whole base breadth (160 ft. in the circumference). Mr. Fergusson is probably, therefore, the first who ever thought it a "plausible theory" that 51° were meant "practically" for a quarter less than 55°. His other three suggestions are of course incompatible with this, but equally so with each other. Very probably the Egyptian priests, who divided most things, even their cubit measure, into seven, may have conceived, as he thinks, the preposterously inconvenient division of the circle and right angle by the same mystical number. But if any *one* of the angles he marks in his pyramid diagram, was meant to contain an exact number of these sevenths, then *no other* of them could do so, even with the roughest approximation attempted in *any* nation's building. If, as he also suggests, the inclination of face to horison was to equal that of edge to axis, then *none* of them contained sevenths. And, above all, I must insist, that, if the angle between edge and axis was, as he calls it, 4 of the septenary modules, that between opposite edges was not exactly 7½; that even in the age of Cheops, however remote we place it, 7½ was not the exact double of four.

The true meaning of Herodotus, and the solution of the easy problem it presents, have been worked doubtless by Greaves, and all Mr. Thurnell's authorities, except Mr. Fergusson, though the only regular solution I can at the moment lay hand on is in a pamphlet by the architect Röber, "Die Ægyptischen Pyramiden," Dresden, 1855, whose sole diagram is identical with what appeared in the *Builder* of Feb. 10, and so are its numbers, but continued three decimals further. Before this or any other theory can be tested, or either the geometry or workmanship of ancient builders be appraised, the plain essential is, that we have measurements, either of lines or angles, proved by their own correspondences to be at least as accurate as those of the builders. Or rather, we must be able to prove that we measure *more* accurately than they built. Now, so far is this from yet being the case with pyramid measurers, that if we calculate the angles of rise, from the bases and "original heights" of Col. Vyse and Mr. Perring, we find, for the Great Pyramid, an angle a full *third of a degree* short of their observed one; while that of the Second Pyramid comes out some 18 minutes lower, and that of the Third, nearly a quarter of a degree lower than their observations. These errors are all in the same direction, and so are the discrepancies between the same measures and those of the lengths of slope; but, what is still stranger, all in the contrary direction. If we square their horizontal and vertical measures, and add the squares, the roots of their sums come out thus:—

| | Great Pyramid. Feet. | | Second. Feet. | | Third. Feet. |
|---|---|---|---|---|---|
| Half-base line | 382· | ... | 353·87 | ... | 177· + |
| Vertical height | 480·75 | ... | 454· | ... | 218· |
| Slope calculated thence | 614·03 | ... | 575·6 | ... | 280·8 + |
| „ measured | 611· | ... | 572·5 | ... | 278·2 |
| Deficiency | 3·03 | | 3·1 | | 2·6 + |

In every case the slope is roundly *a yard* too little! as if measured with tapes that stretch; but now, if to calculate the angles we had combined, instead of the horizontal and vertical lines, the horizontal and inclined (which are plainly more likely to be correct than the vertical, the most difficult of all to measure well), these angles would plainly have all come out still lower, and, therefore, further from Colonel Vyse's values than above. The combination of the vertical and slope, omitting the base, would have screwed up each angle to nearer, though still not within several minutes of his figures; but this is omitting the very measures, the ground lines, that are plainly easiest, and should be allowed the most weight of any.

Professor Smyth and Sir John Herschel are talking, then, of the credit to the ancient architects, of correspondences to "*a single second*," before our measurers can be sure of their measures to *half degrees!* We never can *prove* the builders more accurate than ourselves, whether they were so or not. The whole difference between the solutions of the Herodotean problem and of Taylor's, though not so small as Sir John supposed, is yet comprised, we see, at the widest, in *one minute and a half;* so that the testing of either theory must require measures trustworthy to at least single minutes. Nor is this an extravagant demand in the case of the *Second* (and even other pyramids that retain some casing stones high up), seeing that a minute answers to above 5 in. vertical at the top, or 4 in. horizontal at the foot. Far less accuracy than that attained half a century ago, in our Ordnance surveys, would give us values reliable to a few seconds!

I will now place in order of magnitude all the inclinations given in the work of Colonel Vyse, together with those resulting from several notable geometric relations, including all those I have seen suggested, in the *Builder* or elsewhere.

TABLE OF EGYPTIAN GRADIENTS,

*Theoretic* and Actual.

| | ° | ′ | ″ | Differences. ° | ′ |
|---|---|---|---|---|---|
| I. STEEPER THAN ANY ENTIRE PYRAMID. | | | | | |
| Slope of *four inclined* on *one horizontal* | 75 | 31 | | | |
| Walls of Pyramid of Reegah | 75 | 20 | | | 11 |
| Walls of Pyramid of Meydoon | 74 | 10 | | 1 | 10 |
| Slope of *seven vertical* to *two horizontal* | 74 | 4 | | | 6 |
| Walls of chief Pyramid at Saccara | 73 | 30 | | | 34 |
| Slope of *seven inclined* on *two horizontal* | 73 | 24 | | | 6 |
| Ruined Pyramid bases, Biahmoo | 63 | 30 | | 9 | 54 |
| Slope of *two vertical* to *one horizontal* | 63 | 26 | 6 | | 4 |
| Steepest Brick Pyramid, Dashoor | 57 | 20 | 2 | 6 | 6 |
| Angle *marked on an arc by its radius* | 57 | 17 | 45 | | 2 |
| The Natural Pyramid (Mr. Fergusson's "*most plausible theory*" | 54 | 44 | 8 | 2 | 33 |
| Slope of "*5 horizontal to 7 vertical*" | 54 | 27 | 45 | | 26 |
| Lower Story of South Stone Pyramid, Dashoor (Vyse) | 54 | 14 | 46 | | 13 |
| *The Commensurables*, 3, 4, 5, as half-base, height, and slope | 53 | 7 | 48 | 1 | 6 |
| II. ORDINARY PYRAMID PITCHES. | | | | ′ | ″ |
| Second Pyramid (Vyse or Perring's angle measure) | 52 | 20 | 0 | | |
| Small Pyramids, Gizeh (ditto), 52° 15′ to | 52 | 10 | 0 | 10 | 0 |
| *Seven horizontal to nine vertical* | 52 | 7 | 31 | 2 | 29 |
| Second Pyramid (by Vyse's base and height measures) | 52 | 2 | 45 | 7 | 15 |
| Pyramid of Reegah, upper casing | 52 | | | 2 | 45 |
| *Taylor's suggestion* (half circumference : height :: π : 1) | 51 | 51 | 14 | 8 | 46 |
| *Ditto* (Archimedes's approximation, :: 22 : 7) | 51 | 50 | 34 | | 40 |
| *Herodotus's tradition* (face area = square of height) | 51 | 49 | 38 | | 56 |
| Second Pyramid of Abousir (Vyse's angle measure) | 51 | 42 | 35 | 7 | 3 |
| Second Pyramid of Saccara (by base and height) | 51 | 40 | 14 | 2 | 21 |
| North Pyramid of Abousir (ditto) | 51 | 35 | 0 | 5 | 14 |
| GREAT PYRAMID, Gizeh, by the base and height measures | 51 | 31 | 49 | 3 | 12 |
| *Fergusson's first suggestion* (seventh of a circle) | 51 | 25 | 43 | 6 | 5 |
| GREAT PYRAMID, Hamilton's angle | 51 | 23 | 46 | 1 | 57 |
| *Mediæval theory*, "4 horizontal to 5 vertical" | 51 | 20 | 25 | 3 | 21 |
| North Brick Pyramid, Dashoor (Vyse's angle measure) | 51 | 20 | 25 | | 0 |
| *Half-base : slope :: height : base* | 51 | 19 | 50 | | 35 |
| GREAT PYRAMID, the French angle | 51 | 19 | 4 | | 46 |
| Ditto, by Vyse's base and slope | 51 | 18 | 16 | | 48 |
| Third Pyramid (Vyse's angle) | 51 | 0 | 0 | 18 | 16 |
| Ditto, by base and slope | 50 | 24 | 30 | 35 | 30 |
| Small Pyramid, Dashoor | 50 | 11 | 41 | 12 | 49 |
| Slope of *Five horizontal* to *six vertical* | 50 | 11 | 40 | | 1 |
| *Fergusson's third suggestion* (half-base : slope :: axis : edge) | 49 | 56 | 23 | 15 | 17 |
| *Commensurables*, 3, 4, 5, as half-base, slope, and edge | 48 | 35 | 20 | 21 | 3 |
| *Base area* = a circle whose radius is the height | 48 | 27 | 7 | 8 | 13 |
| *Fergusson's second suggestion* (edge inclined to axis one-seventh of a circle) | 48 | 26 | 17 | | 50 |
| III. EXCEPTIONALLY LOW PITCHES. | | | | | |
| North Stone Pyramid, Dashoor (Vyse's angle measure) | 43 | 36 | 11 | | 1 |
| *Commensurables*, 20, 21, 29, *as height, half-base, and slope* | 43 | 36 | 10 | | |
| Upper Story of South Stone Pyramid, Dashoor | 43 | | | 36 | 10 |
| IV. INCLINATIONS OF PASSAGES. GROUP I. | | | | | |
| Eighth Pyramid, Gizeh (Vyse and Perring) | 34 | 5 | | | |
| Slope given by 3 *horizontal to* 2 *vertical* | 33 | 41 | 24 | 23 | 36 |
| Seventh Pyramid, Gizeh | 33 | 35 | | 6 | 24 |
| Sixth Pyramid, Gizeh | 30 | 0 | | 215 | |
| Slope of "1 *vertical to* 2 *inclined*" | 30 | 0 | | 0 | |
| Elevation of Earth's axis at Gizeh | 29 | 59 | | 1 | |
| *Commensurables*, 15, 8, 17, as base, vertical, and slope | 28 | 4 | | 115 | |
| Ninth Pyramid, Gizeh | 28 | 0 | | 4 | |
| North Stone Pyramid, Dashoor | 27 | 56 | | 4 | |
| Altered Pyramid, Dashoor, W. passage | 26 | 36 | | 80 | |
| Eighth Pyramid, Gizeh, inner passage | 26 | 35 | | 1 | |
| Slope of 2 *horizontal to* 1 *vertical* | 26 | 34 | | 1 | |
| GREAT PYRAMID, ascending passage | 26 | 18 | | 16 | |
| Altered Pyramid, Dashoor, N. passage | 26 | 10 | | 8 | |
| Third Pyramid, Gizeh | 26 | 2 | | 8 | |
| South Pyramid of Abousir | 26 | 0 | | 2 | |
| Second Pyramid. Entrance | 25 | 55 | | 5 | |
| Slope of 5 *inclined* to 2 *vertical* | 23 | 34 | | 141 | |
| Chief Pyramid at Saccara | 23 | 20 | | 14 | |
| Slope of 5 *horizontal* to 2 *vertical* | 21 | 48 | | 92 | |
| Second Pyramid, Caviglia's Passages | 21 | 40 | | 8 | |

Now, I cannot but ask, with this bird's eye view before us, where have we any evidence *yet* of the Egyptians "embodying" in these works any geometry, or any theoretic or liberal science at all? What single problem have they approximated *so nearly* as they have the most common cases of the contractor's foremanlike rule of thumb, "two to one," or so many horizontal to so many vertical? The more we compare all the measures, the more decidedly is the evidence *against* their having ever followed any more refined rule than our vulgarest work-

men; unless, perhaps, in having discovered that certain other triads of numbers besides 3, 4, 5, would fit as a right-angled trigon, such as 8, 15, 17, and 20, 21, 29, while our artisans have a superstition that 3, 4, 5, are the only ones. Now these ratios they plainly discovered by *mechanical experiment* only. The hypothenuse to 4 and 5 (their favourite ratio between base and perpendicular) is 6·4031, which they could not distinguish by measurement from 6·4. They evidently believed that 40, 50, and 64 made a right-angled triangle; and hence, that a pyramid with this half section had the property,—Half-base : height :: slope : base; for as 40 : 50 :: 64 : 80.

Even Mr. Fergusson's *Natural* pyramid, which I once thought they had aimed at in the commencement of the ugly altered pyramid of Dashoor, was not, you see, approached so nearly as the vulgar engineerish "*five to seven*." This "rule of thumb" was all that the beginners of that work thought of; and so was "*four to five*" all that Cheops meant. What the guides told Herodotus, cannot prove, with much deference to Sir John Herschel, that the founders solved any such problem, or "did intend" to solve it, nor even that any Egyptian before Euclid ever solved it. The only thing it proves is that some land-measurer had observed this coincidence, and it forthwith became one of the marvels of the *cicerone*; just as we read it was one of the marvels of some *Great Eastern* of her day, that when her finished tonnage was reckoned, it came out = the date of the year. That the Great Pyramid was meant simply to rise 5, on 4 horizontal, is as plain as that its passage, which has so tormented the astronomers, instead of being directed to any pole-star, was simply to descend "*one in two!*" But you will ask why I have called this "the Mediæval theory," and thereby hangs another sly joke of Fate which is worth relating.

Perhaps it would puzzle some if they were asked wherein Cheops is one of the "dead but sceptred sovereigns," and what he has done to our modern world. Now, I propose to demonstrate exactly what he still governs, and *all* that he governs among us. M. Viollet-le-Duc has shown that the mosque-builders of Cairo copied the proportion of all their arches (the earliest refined or æsthetic pointed arches known) from the Pyramids within sight: that is, they made the span and rise as 8 to 5, like the base and height of the Pyramid. He also shows that our Crusaders copied, and brought to the West, this proportion of pointed arch, and made it the standard one of Early French Gothic, if not of the first Gothic everywhere. Now the first pointed window-heads regulated the proportion of the glazing quarries, as any child may observe that these were made to fit into the angle of the two chords drawn from the point of the arch to its springings. So their standard proportion of height to breadth is 5 to 4. The heraldic bearing called a *lozenge* was nothing but a quarry of glass, called in France by the same name; and in the Heraldry of the *Encyc. Metrop.* I find an old herald's dictum accordingly, that "all authorities are agreed that the height and breadth of the true lozenge must be as 5 to 4." Well, but what are heraldic lozenges to men of the nineteenth century? A great deal, sir. Much more before many eyes than they were in the Middle Ages. If you play at cards with a Spaniard, you will find that instead of the knave of diamonds, you have the knave of *lozenges*. Lozenges of gules do more unto men of the nineteenth century than to any knight that ever fell in a tournament. Now, who has regulated their form for us? You see, if we cannot trace

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we can most rigorously trace the proud imagining of poor Cheops's mind, till we find our "King of Diamonds" is demonstrably he; and all he hath done at last is to rule the form of spots on one fourth of all our club cards, from the ace to the knave!

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P.S. The property above pointed out, in a base and perpendicular as 4 : 5, is even *more* remarkable in each of the other gradients, for which I conceive the outer slopes to have been meant, as the following comparison will show:—

| Half Base. | Perpendicular. | Slope. | | |
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| 4 | 5 | 6·4031 = | 6·4 | + ·0031 |
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I have no doubt these were the proportions intended, and that by comparing the absolute measures, we shall have the Egyptian cubit or foot more exactly than any other ancient standard.

Mr. Drach, I see, has also referred Mr. Thurnell to Röber's identical solution of the problem. With regard to Röber's other theories, I shall believe they used the heptagon when any example of that figure shall be found in their works. It is rare enough in *any* architecture. An early window in St. John's Church, Winchester, has the only septfoil I know, in England or France, though fourteen seems now the established number of spokes for our hind carriage-wheels.

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## SPIRE OF ST. PAUL'S, BEDFORD.

A CORRESPONDENT says,—The tower and spire of this church are now taken down for re-building, in pursuance of the alterations agreed upon. The fine roof of the church had previously been well replaced from ascertained danger in 1848. In the case of the tower, it proved not a day too early; the symptoms of danger had appeared from large cracks, which had been too much slighted. Some Norman work was found, supposed to have been removed from the celebrated "Castle;" but the general masonry was about the worst Mediæval work ever known, the stones being held together by a muddy substance, with scarcely a symptom of lime, though not wanting in the neighbourhood; and it is a great wonder it could stand so long. A Bedford paper (alluding to a terrible crash elsewhere fifty years ago) suggests that this might be a useful hint towards the examination of other towers (which was most carefully done in the instance of St. Saviour's, Southwark, about fifteen years ago), where there might exist not unlikely danger.

## CLARE COUNTY LUNATIC ASYLUM.

THIS building, in common with the majority of those in Ireland the purpose of which is similar, has been erected on a site selected for its salubrity, most desirable for its command of cheerful scenery, and its convenience to the main road of the county, to accommodate the lunatic poor for whom it is intended.

The site consists of about 40 acres of land within a mile of Ennis, on the Gort-road, at the northern side of the town. The building faces the south, towards which the ground slopes gently. The character of the building is simple and bold, and suits very well for works of the class; there is a central tower of good outline; the windows generally are circular-headed, have plain square architraves surrounding them stopped on square sills. A little more finish is given to the central or official department than the rest, otherwise there is nothing striking as an architectural composition.

It consists of a front centre building containing the official residences and public rooms, two wing buildings for the patients, with two airing courts at the rear of each, and a rear centre building containing the dining-hall, kitchen, laundry, and other offices: the front and rear centre buildings are connected by covered corridors.

The extreme length is 600 ft., of which the front centre building occupies 80 ft., the wing buildings extend 200 ft. at each side, where they return about 100 ft., the remainder of the length being occupied by the infirmaries.

The extreme depth of the building at the centre is 330 ft., and embraces the kitchen and laundry offices, with the rear and front centre buildings. The day-rooms average in size 40 ft. by 24 ft. The dining and recreation hall is 56 ft. by 30 ft., and the height of two stories, with an open roof.

A series of day-rooms, on the ground-floor, dormitories on the upper floors, connected by passages of moderate width, have been adopted. It is thought, with the sanction of the Board of Control, which in Ireland takes the place of the Commissioners of Lunacy, that this arrangement in separating the day and night accommodation of the patients, and otherwise assimilating their circumstances to those of ordinary life, is preferable to the usual corridor, or "ward system," as it is termed.

The infirmary buildings are placed at the extreme ends of the wings, having yards and airing sheds: in connexion therewith they have also separate entrances and staircases.

At the rear, connected with the airing courts of the male wing is a working ground, with suitable carpenters', shoemakers', tailors', and other workshops, opening to the same; at the other side of the kitchen and stable-yard, and connected with the airing courts of the female wing is the drying-ground, communicating at one end with the laundry offices. Suitable sheds and latrines are provided for all the airing courts.

The front centre building, which projects about 50 ft. from the wings, is placed at a higher level, and with a terrace front, admits of a basement, in which the kitchens and offices for the physician and matron are placed.

The chapel, which has a vestry and separate entrances for male and female patients, is situated on the first-floor at the rear of the front centre building.

The ground-floors of the wings are chiefly appropriated for day-rooms and single-rooms. The day-rooms nearest to the centre, at each side, are for the tranquil patients; those more distant for the refractory. These latter are mostly intended to sleep in single rooms, situated in the returns of the wings. The refractory patients all through will be separated from the rest. The tranquil patients will sleep on the upper floor, chiefly in dormitories; and the middle class of patients will occupy the first or middle floor, where day-rooms and dormitories are provided for them.

The attendants' rooms are placed next the dormitories, with glazed doors between, and are in the proportion of one attendant to thirteen patients on an average.

The whole number of patients for which accommodation is provided is 260; and 25 ft. superficial are provided in the day-rooms for each patient, and 50 ft. superficial in the dormitories, the ceilings being 12 ft. in height.

Infirmary accommodation is provided for one-tenth of the whole number of patients, and single rooms in the proportion of 30 per cent. The water-closets, baths, and lavatories are placed together in projections, in order to simplify the arrangement of the drainage and water supply, and to keep those offices as much as possible separated from the inhabited apartments.

Two staircases with solid wells, waiting and reception rooms, together with side entrances for patients and their friends, are provided for each wing.

The kitchen, 33 ft. by 30 ft., adjoins a scullery and a boiler-house. The laundries and wash-houses are at one side of the kitchen court, and the kitchen stores and workshops at the other side with the attendants' dining-room and the female servants' rooms overhead. On the first floor of the range of buildings, having a separate entrance and staircase, are the storekeepers' rooms.

The farm offices, steward's house, and stables for the board of visitors, are to comprise a separate detached block of buildings, and a house for the gardener will be erected in a retired part of the grounds.

The walls are built of the local light-blue limestone, and the outside walls are lined with brick of the locality, the quoins and dressings neatly chiselled. Sandstone is used for staircases and door-sills; and, as a check to the spread of fire, should such ever happen, stone sills, resting on arches, are set across the corridors at intervals of about 40 ft. The cross walls which there occur are carried up to the underside of the slating. The plates for the floors throughout are carried on stone corbels, and wood lintels are very sparingly, if at all, used.

The roofs of the dining-hall, kitchen, and laundry are formed with open timber framing, and have louvred ventilators.

The floors of the water-closets, lavatories, and baths are formed of Valentia slate.

Almost throughout the entire building the interior is plastered.

The windows have wood sashes, except those to the single rooms for refractory patients, which are of wrought-iron. The ventilation is to be effected by flues from each room, carried into horizontal galvanized iron air-trunks in the roofs, thence into the side towers, in each of which a

shaft is carried up, with fire-place at bottom, to ensure an upward current.

It is intended to have a heating apparatus under each wing, from which warm air may be supplied to each room, in connexion with the system of ventilation. The day-rooms, dormitories, dining-rooms, residences, and some of the single rooms will have fireplaces.

The site affords considerable facility for obtaining water from the river Fergus, and a steam-pump is proposed to supply the principal cisterns at a high level, over the kitchen. Cisterns are also placed over the lavatories and baths. The rain-water will be collected in underground tanks.

These buildings were chiefly designed by Mr. W. Fogerty, architect, of Dublin, and are being completed under the joint superintendence of Mr. J. Fogerty, of Limerick, and Mr. A. C. Adair, the county surveyor of Clare. To this latter gentleman are entrusted the arrangements for the water-supply, the bath and lavatory fittings, and the drying-closets.

The amount of the present contract, exclusive of boundary-wall, gate and other lodges, farm offices, baths, water-closets, and engineering works, is about 29,000*l.*; but it is estimated that when these additional works are completed, the total cost will amount to 35,000*l.* Mr. Michael Meade, of Dublin, is the contractor, and Mr. Fitzgerald clerk of the works. It is expected that the whole will be completed within a year from the present date.

## THE EAST INDIA CLUB, ST. JAMES'S-SQUARE.

THE East India United Service Club has just entered into possession of its new club-house. The old building, No. 14, St. James's-square, had long been found too small for the increasing numbers of the Club, and the members therefore decided to rebuild No. 15, St. James's-square, and add it to their former house, No. 14. Mr. Charles Lee was their architect. The façade is of an ordinary Italian type. The interior of the club-house has been fitted throughout with the conveniences supplied by modern ingenuity, and is to be handsomely decorated.

The East India United Service Club was originally founded in 1848, to meet the wants of the various services which collectively administer the Indian Government. It has, however, gradually lost its exclusively Indian character, more especially since the transfer of our Eastern Empire to the Queen, and it has now on its rolls many officers belonging to the home forces. The Club numbers upwards of 1,700 members, of whom generally about 800 are in England. The new building has been designed to accommodate over 1,000 members. The works have been executed by Messrs. George Myers & Sons; and the furniture was supplied by Messrs. Holland & Sons. Mr. Alfred Howard acted as clerk of the works.

## NEW UNION WORKHOUSE, MORPETH.

THE foundation-stone of the new workhouse at Morpeth was laid on Wednesday, the 21st ultimo, by Lady Elizabeth Grey. The site of this building is both salubrious and picturesque, on the banks of the River Wansbeck. One boundary line faces the main street; the opposite extremity is lapped by the stream. The workhouse will consist of several groups of buildings placed in three leading lines, the first lining the street frontage, the second occupying a central position on the site, and the third facing the river. Throughout the disposition of the different classes, the officials will occupy central positions in the various buildings, having the male inmates always on the left hand, and the females on the right. Thus in the length of frontage the entrance-gateway will give admission to a covered way into a large pebble paved court-yard. From this passageway will depart, on the one hand immediately behind the porter's apartment, the way to the wards for the female probationers and vagrants; and on the other, beyond a waiting-room and staircase leading to a spacious board-room on an upper floor, the way to the wards and yards for the male probationers and vagrants. The master and mistress of the establishment will be located in the centre of the main house, having the same arrangement with regard to the sexes made throughout, from basement to attics. The sick will be accommodated in the third block of building, near the water's edge. Separate isolated accommodation for infectious cases will be provided, as well as male and female itch wards, and a dead house. Plans and elevations, showing these arrangements, were deposited beneath the foundation-stone. Mr. F. R. Wilson, Alnwick, is the architect; Messrs. Middlemas and Stafford are the contractors.

## PULLING DOWN AND BUILDING UP IN HAMBURG.

GREAT excitement has been caused by an association of building speculators having bought up a large tract of house property in the very heart of the city, for the purpose of pulling down the buildings and erecting new ones on the site. Some idea of the extent of this enterprise may be formed from the fact of no less than 987 families (comprising about 4,000 persons) having received notice to quit on the 1st of May. The premises in question consist of old tumble-down houses, situated in narrow lanes, blind alleys, and small courts, known by the euphonious appellation of the "Gängeviertel," tenanted by squalid inhabitants of the very poorest and most wretched classes, accustomed to the inconveniences of foul air and close but cheap quarters. The original plan was to make a public thoroughfare leading from the Grosse Bleichen to the Grossneumarkt, which was greatly needed, and would have proved a great facility for communication between two important quarters of the city; but for this purpose they required from the State a subvention of a million marks banco, as indemnity for the ground given up for streets 50 ft. wide, which was refused by the Legislature. Under these circumstances the projectors have altered their plans, and now intend to make private streets and courts, with which the authorities have no power to interfere. As the commerce and industry of the city are increasing annually in a most unparalleled ratio, so the population is ever growing larger, more particularly among the working classes, who are attracted from all parts of the interior of Germany and the surrounding countries by the high price paid for skilled labour at Hamburg. It cannot be denied that there is in consequence a great scarcity of dwellings suited for the requirements and within the reach of the working classes, and it will be apparent that this scarcity will be greatly increased on the 1st of May, when 4,000 persons more will be obliged to find other suitable lodgings. To obviate this dilemma to some extent, a provisional committee of patriotic and influential gentlemen has just been formed for the purpose of getting up a joint stock company, to be called "The Building Association of 1866," with a capital of 1,000,000 marks, in 2,000 shares of 500 marks each, for the purpose of building small houses and tenements suited for mechanics and their families, and to be let to them at rents giving a return of not more than 5 per cent. per annum. According to the prospectus issued, the company is to declare itself "constituted" as soon as one half of the shares are taken. The proposal seems to find encouragement, and is warmly supported by the better part of the local press.

## TEMPERANCE BUILDINGS IN THE NORTH.

*Sunderland.*—The advocates of the temperance movement in Sunderland are now making strenuous efforts on behalf of their cause, and are, on the whole, so generally successful, that the bold scheme of erecting a public building is now in a fair way of being realised. The building is to be erected at a cost of 10,000*l.*, and will be called the "Victoria Hall and Temperance Institute." It will occupy a good site at the north end of the Toward road, facing the new extension park, and easy of access to the public. The length of the building, which runs north and south, will be 260 ft., by a medium width of 75 ft., and in addition to containing a grand hall, with dress circle and gallery, capable of accommodating 2,000 people, will include a smaller lecture-hall, in which 600 can be seated, besides refreshment-rooms, club-rooms, anterooms, and news-room. The extreme north end is furnished with a clock tower, which will rise to a height of 160 ft. The style adopted is Gothic, and Mr. Hoskins, of Darlington, is the architect.

*Seaton Carew.*—The Temperance Society here have decided upon supplying a want long felt in this neighbourhood, by erecting a Temperance Hall on the site of the old Boat-house. Attached to the lecture-hall is a reading-room, &c., which will be used as a Mechanics' Institute. Mr. Hoskins is the architect. The building is of Early English character.

## THE PARIS EXHIBITION OF 1867 AND ARCHITECTURE.

SUCH of our readers as agreed with us in the expression of regret that architecture, notwithstanding the good and useful presence of Mr. Beresford Hope, was not represented by a professional architect on the English Commission in support of the coming Paris Exhibition, will be glad to hear that Mr. William Tite, M.P., has been added to the list, having been unanimously elected a Commissioner on the motion of Lord Granville.

## SHOP-FRONT IN NEW BOND STREET.

MR. BENSON'S PREMISES.

IN Bond-street, Old and New, several handsome shop-fronts have been recently erected. Comptroller Sir Thomas *Bond*, of Peckham, who built the first part of the street, on the site of Clarendon House, two years before the "Glorious Revolution" of 1688, and ruined himself by so doing, would not know it again. New Bond-street, as its title tells, came after, say 1721. In this part of the well-known thoroughfare, the latest of the alterations has been carried out by Messrs. John Drew & Co., of Hatton Garden, under the directions of Mr. Cockerell, architect, for Mr. J. W. Benson, of Ludgate-hill, the well-known watch and clock maker, at premises formerly the banking-house of Sir W. P. Call, Marten, & Co. Originally in all its arrangements essentially intended for private occupation, considerable difficulties were presented during the progress of the alterations, all of which, however, were of course surmounted.

Those who knew the house before its alteration, will recollect the unsightly railings which guarded the areas in its front. These have been removed, and the area spaces covered over with York stone, supported by strong wrought-iron T bars, while light is admitted to the basement by means of six cast-iron horizontal frames, glazed with rough plate-glass. The whole of the brickwork, which occupied the position now devoted to the shop-front, together with the partition and party-walls inside have been cleared away, and in this operation good use was made of Drew's patent shoring needles. These walls have been replaced by strong cast-iron stanchions, which, secreted in the front, fixed on York stone templates, carry wrought-iron girders, 2 ft. deep, and 14 in. wide, running the whole length of the front, and cased in with tiles and mastic where not bedded in the wall.

The front itself, as seen in our illustration, consists of two windows, each 21 ft. long, divided by a spacious lobby, the floor of which is laid with encaustic tiles, with a margin of Sicilian marble. The entablature, extending along the whole length of the front, is of Portland stone, supported by columns and pilasters of Lizard serpentine marble, on rubbed Portland stone bases. These columns have fluted and gilt caps and moulded bases, the arches being also moulded, and the spandrels engraved and gilt. The frieze on the entablature contains black marble tablets, on which the name and number are cut in, and gilt. The front is illuminated at night by lamps placed in the shop above the inner cases of the windows, and is secured by means of Francis's revolving iron shutters, which descend behind the marble columns, so that these are still visible when the shop is closed. The entrance-lobby is fitted up inside with polished mahogany columns, and the stanchions supporting the girders are hidden by silvered glass, which also gives a light and handsome appearance to this portion of the front. The interior decorations of the walls and ceilings were designed and executed by Mr. Hatfield, of Marlborough-street, and are most tasteful and elegant.

The shop-front commends itself to attention by a design that avoids the cavernous insecure aspect of the majority of such formations, and by the richness of the materials employed.

men; unless, perhaps, in having discovered that certain other triads of numbers besides 3, 4, 5, would fit as a right-angled trigon, such as 8, 15, 17, and 20, 21, 29, while our artisans have a superstition that 3, 4, 5, are the only ones. Now these ratios they plainly discovered by *mechanical experiment* only. The hypothenuse to 4 and 5 (their favourite ratio between base and perpendicular) is 6·4031, which they could not distinguish by measurement from 6·4. They evidently believed that 40, 50, and 64 made a right-angled triangle; and hence, that a pyramid with this half section had the property,—Half-base : height : : slope : base; for as 40 : 50 : : 64 : 80.

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The front centre building, which projects about 50 ft. from the wings, is placed at a higher level, and with a terrace front, admits of a basement, in which the kitchens and offices for the physician and matron are placed.

The chapel, which has a vestry and separate entrances for male and female patients, is situated on the first-floor at the rear of the [illegible] stores and workshops at the other side with the attendants' dining-room and the female servants' rooms overhead. On the first floor of the range of buildings, having a separate entrance and staircase, are the storekeepers' rooms.

The farm offices, steward's house, and stables for the board of visitors, are to comprise a separate detached block of buildings, and a house for the gardener will be erected in a retired part of the grounds.

The walls are built of the local light-blue limestone, and the outside walls are lined with brick of the locality, the quoins and dressings neatly chiselled. Sandstone is used for staircases and door-sills; and, as a check to the spread of fire, should such ever happen, stone sills, resting on arches, are set across the corridors at intervals of about 40 ft. The cross walls which there occur are carried up to the underside of the slating. The plates for the floors throughout are carried on stone corbels, and wood lintels are very sparingly, if at all, used.

The roofs of the dining-hall, kitchen, and laundry are formed with open timber framing, and have louvred ventilators.

The floors of the water-closets, lavatories, and baths are formed of Valentia slate.

Almost throughout the entire building the interior is plastered.

The windows have wood sashes, except those to the single rooms for refractory patients, which are of wrought-iron. The ventilation is to be effected by flues from each room, carried into horizontal galvanized iron air-trunks in the roofs, thence into the side towers, in each of which a

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shaft is carried up, with fire-place at bottom, to ensure an upward current.

It is intended to have a heating apparatus under each wing, from which warm air may be supplied to each room, in connexion with the system of ventilation. The day-rooms, dormitories, dining-rooms, residences, and some of the single rooms will have fireplaces.

The site affords considerable facility for obtaining water from the river Fergus, and a steam-pump is proposed to supply the principal cisterns at a high level, over the kitchen. Cisterns are also placed over the lavatories and baths. The rain-water will be collected in underground tanks.

These buildings were chiefly designed by Mr. W. Fogerty, architect, of Dublin, and are being completed under the joint superintendence of Mr. J. Fogerty, of Limerick, and Mr. A. C. Adair, the county surveyor of Clare. To this latter gentleman are entrusted the arrangements for the water-supply, the bath and lavatory fittings, and the drying-closets.

The amount of the present contract, exclusive of boundary-wall, gate and other lodges &c. [illegible] Messrs. George Myers & Sons; and the furniture was supplied by Messrs. Holland & Sons. Mr. Alfred Howard acted as clerk of the works.

## NEW UNION WORKHOUSE, MORPETH.

THE foundation-stone of the new workhouse at Morpeth was laid on Wednesday, the 21st ultimo, by Lady Elizabeth Grey. The site of this building is both salubrious and picturesque, on the banks of the River Wansbeck. One boundary line faces the main street; the opposite extremity is lapped by the stream. The workhouse will consist of several groups of buildings placed in three leading lines, the first lining the street frontage, the second occupying a central position on the site, and the third facing the river. Throughout the disposition of the different classes, the officials will occupy central positions in the various buildings, having the male inmates always on the left hand, and the females on the right. Thus in the length of frontage the entrance-gateway will give admission to a covered way into a large pebble paved court-yard. From this passageway will depart, on the one hand immediately behind the porter's apartment, the way to the wards for the female probationers and vagrants; and on the other, beyond a waiting-room and staircase leading to a spacious board-room on an upper floor, the way to the wards and yards for the male probationers and vagrants. The master and mistress of the establishment will be located in the centre of the main house, having the same arrangement with regard to the sexes made throughout, from basement to attics. The sick will be accommodated in the third block of building, near the water's edge. Separate isolated accommodation for infectious cases will be provided, as well as male and female itch wards, and a dead house. Plans and elevations, showing these arrangements, were deposited beneath the foundation-stone. Mr. F. R. Wilson, Alnwick, is the architect; Messrs. Middlemas and Stafford are the contractors.

## PULLING DOWN AND BUILDING UP IN HAMBURG.

GREAT excitement has been caused by an association of building speculators having bought up a large tract of house property in the very heart of the city, for the purpose of pulling down the buildings and erecting new ones on the site. Some idea of the extent of this enterprise may be formed from the fact of no less than 987 families (comprising about 4,000 persons) having received notice to quit on the 1st [illegible]. The premises in question consist of [illegible]le-down houses, situated in narrow [illegible]nd alleys, and small courts, known by [illegible]onious appellation of the "Gänge-[illegible] tenanted by squalid inhabitants of the [illegible]est and most wretched classes, accus- [illegible] the inconveniences of foul air and [illegible]cheap quarters. The original plan was [illegible], public thoroughfare leading from the [illegible]leichen to the Grossneumarkt, which [illegible]dy needed, and would have proved a [illegible]lity for communication between two [illegible] quarters of the city; but for this [illegible]ey required from the State a subven- [illegible]million marks banco, as indemnity for [illegible]d given up for streets 50 ft. wide, [illegible] refused by the Legislature. Under [illegible]mstances the projectors have altered [illegible]s, and now intend to make private [illegible]l courts, with which the authorities [illegible]ower to interfere. As the commerce [illegible]y of the city are increasing annually [illegible]nparalleled ratio, so the population [illegible]ving larger, more particularly among [illegible]g classes, who are attracted from all [illegible]e interior of Germany and the sur- [illegible]ountries by the high price paid for [illegible]our at Hamburg. It cannot be [illegible]; there is in consequence a great [illegible]lwellings suited for the requirements [illegible] the reach of the working classes, [illegible]e apparent that this scarcity will be [illegible]ased on the 1st of May, when 4,000 [illegible]e will be obliged to find other suit- [illegible]s. To obviate this dilemma to some [illegible]ovisional committee of patriotic and [illegible]entlemen has just been formed for [illegible] of getting up a joint stock company, [illegible] "The Building Association of 1866," with a capital of 1,000,000 marks, in 2,000 shares of 500 marks each, for the purpose of building small houses and tenements suited for mechanics and their families, and to be let to them at rents giving a return of not more than 5 per cent. per annum. According to the prospectus issued, the company is to declare itself "constituted" as soon as one half of the shares are taken. The proposal seems to find encouragement, and is warmly supported by the better part of the local press.

## TEMPERANCE BUILDINGS IN THE NORTH.

*Sunderland.*—The advocates of the temperance movement in Sunderland are now making strenuous efforts on behalf of their cause, and are, on the whole, so generally successful, that the bold scheme of erecting a public building is now in a fair way of being realised. The building is to be erected at a cost of 10,000*l.*, and will be called the "Victoria Hall and Temperance Institute." It will occupy a good site at the north end of the Toward road, facing the new extension park, and easy of access to the public. The length of the building, which runs north and south, will be 260 ft., by a medium width of 75 ft., and in addition to containing a grand hall, with dress circle and gallery, capable of accommodating 2,000 people, will include a smaller lecture-hall, in which 600 can be seated, besides refreshment-rooms, club-rooms, anterooms, and news-room. The extreme north end is furnished with a clock tower, which will rise to a height of 160 ft. The style adopted is Gothic, and Mr. Hoskins, of Darlington, is the architect.

*Seaton Carew.*—The Temperance Society here have decided upon supplying a want long felt in this neighbourhood, by erecting a Temperance Hall on the site of the old Boat-house. Attached to the lecture-hall is a reading-room, &c., which will be used as a Mechanics' Institute. Mr. Hoskins is the architect. The building is of Early English character.

## THE PARIS EXHIBITION OF 1867 AND ARCHITECTURE.

SUCH of our readers as agreed with us in the expression of regret that architecture, notwithstanding the good and useful presence of Mr. Beresford Hope, was not represented by a professional architect on the English Commission in support of the coming Paris Exhibition, will be glad to hear that Mr. William Tite, M.P., has been added to the list, having been unanimously elected a Commissioner on the motion of Lord Granville.

## SHOP-FRONT IN NEW BOND STREET.

MR. BENSON'S PREMISES.

IN Bond-street, Old and New, several handsome shop-fronts have been recently erected. Comptroller Sir Thomas *Bond*, of Peckham, who built the first part of the street, on the site of Clarendon House, two years before the "Glorious Revolution" of 1688, and ruined himself by so doing, would not know it again. New Bond-street, as its title tells, came after, say 1721. In this part of the well-known thoroughfare, the latest of the alterations has been carried out by Messrs. John Drew & Co., of Hatton Garden, under the directions of Mr. Cockerell, architect, for Mr. J. W. Benson, of Ludgate-hill, the well-known watch and clock maker, at premises formerly the banking-house of Sir W. P. Call, Marten, & Co. Originally in all its arrangements essentially intended for private occupation, considerable difficulties were presented during the progress of the alterations, all of which, however, were of course surmounted.

Those who knew the house before its alteration, will recollect the unsightly railings which guarded the areas in its front. These have been removed, and the area spaces covered over with York stone, supported by strong wrought-iron T bars, while light is admitted to the basement by means of six cast-iron horizontal frames, glazed with rough plate-glass. The whole of the brickwork, which occupied the position now devoted to the shop-front, together with the partition and party-walls inside have been cleared away, and in this operation good use was made of Drew's patent shoring needles. These walls have been replaced by strong cast-iron stanchions, which, secreted in the front, fixed on York stone templates, carry wrought-iron girders, 2 ft. deep, and 14 in. wide, running the whole length of the front, and cased in with tiles and mastic where not bedded in the wall.

The front itself, as seen in our illustration, consists of two windows, each 21 ft. long, divided by a spacious lobby, the floor of which is laid with encaustic tiles, with a margin of Sicilian marble. The entablature, extending along the whole length of the front, is of Portland stone, supported by columns and pilasters of Lizard serpentine marble, on rubbed Portland stone bases. These columns have fluted and gilt caps and moulded bases, the arches being also moulded, and the spandrels engraved and gilt. The frieze on the entablature contains black marble tablets, on which the name and number are cut in, and gilt. The front is illuminated at night by lamps placed in the shop above the inner cases of the windows, and is secured by means of Francis's revolving iron shutters, which descend behind the marble columns, so that these are still visible when the shop is closed. The entrance-lobby is fitted up inside with polished mahogany columns, and the stanchions supporting the girders are hidden by silvered glass, which also gives a light and handsome appearance to this portion of the front. The interior decorations of the walls and ceilings were designed and executed by Mr. Hatfield, of Marlborough-street, and are most tasteful and elegant.

The shop-front commends itself to attention by a design that avoids the cavernous insecure aspect of the majority of such formations, and by the richness of the materials employed.

men; unless, perhaps, in having discovered that certain other triads of numbers besides 3, 4, 5, would fit as a right-angled trigon, such as 8, 15, 17, and 20, 21, 29, while our artisans have a superstition that 3, 4, 5, are the only ones. Now these ratios they plainly discovered by *mechanical experiment* only. The hypothenuse to 4 and 5 (their favourite ratio between base and perpendicular) is 6·4031, which they could not distinguish by measurement from 6·4. They evidently believed that 40, 50, and 64 made a right-angled triangle; and hence, that a pyramid with this half section had the property,—Half-base : height :: slope : base; for as 40 : 50 :: 64 : 80.

Even Mr. Fergusson's *Natural* pyramid, which I once thought they had aimed at in the commencement of the ugly altered pyramid of Dashoor, was not, you see, approached so nearly as the vulgar engineerish "*five to seven*." This "rule of thumb" was all that the beginners of that work thought of; and so was "*four to five*" all that Cheops meant. What the guides told Herodotus, cannot prove, with much deference to Sir John Herschel, that the founders solved any such problem, or "did intend" to solve it, nor even that any Egyptian before Euclid ever solved it. The only thing it proves is that some land-measurer had observed this coincidence, and it forthwith became one of the marvels of the *ciceroni*; just as we read it was one of the marvels of some *Great Eastern* of her day, that when her finished tonnage was reckoned, it came out = the date of the year. That the Great Pyramid was meant simply to rise 5, on 4 horizontal, is as plain as that its passage, which has so tormented the astronomers, instead of being directed to any pole-star, was simply to descend "*one in two!*" But you will ask why I have called this "the Mediæval theory," and thereby hangs another sly joke of Fate which is worth relating.

Perhaps it would puzzle some if they were asked wherein Cheops is one of the "dead but sceptred sovereigns," and what he has done to our modern world. Now, I propose to demonstrate exactly what he still governs, and *all* that he governs among us. M. Viollet-le-Duc has shown that the mosque-builders of Cairo copied the proportion of all their arches (the earliest refined or æsthetic pointed arches known) from the Pyramids within sight: that is, they made the span and rise as 8 to 5, like the base and height of the Pyramid. He also shows that our Crusaders copied, and brought to the West, this proportion of pointed arch, and made it the standard one of Early French Gothic, if not of the first Gothic everywhere. Now the first pointed window-heads regulated the proportion of the glazing quarries, as any child may observe that these were made to fit into the angle of the two chords drawn from the point of the arch to its springings. So their standard proportion of height to breadth is 5 to 4. The heraldic bearing called a *lozenge* was nothing but a quarry of glass, called in France by the same name; and in the Heraldry of the *Encyc. Metrop.* I find an old herald's dictum accordingly, that "all authorities are agreed that the height and breadth of the true lozenge must be as 5 to 4." Well, but what are heraldic lozenges to men of the nineteenth century? A great deal, sir. Much more before many eyes than they were in the Middle Ages. If you play at cards with a Spaniard, you will find that instead of the knave of diamonds, you have the knave of *lozenges*. Lozenges of gules do more unto men of the nineteenth century than to any knight that ever fell in a tournament. Now, who has regulated their form for us? You see, if we cannot trace

> "Imperial Cæsar, dead and turn'd to clay,
> Stopping a hole to keep the wind away,"

we can most rigorously trace the proud imagining of poor Cheops's mind, till we find our "King of Diamonds" is demonstrably he; and all he hath done at last is to rule the form of spots on one fourth of all our club cards, from the ace to the knave!

E. L. GARBETT.

P.S. The property above pointed out, in a base and perpendicular as 4 : 5, is even *more* remarkable in each of the other gradients, for which I conceive the outer slopes to have been meant, as the following comparison will show :—

| Half Base. | Perpendicular. | Slope. | |
|---|---|---|---|
| 4 | 5 | 6·4031 = 6·4 | + ·0031 |
| 5 | 7 | 8·6023 = 8·6 | + ·0023 |
| 7 | 9 | 11·4017 = 11·4 | + ·0017 |
| 5 | 6 | 7·8664 = 8·666 | — ·0002 |
| 21 | 20 | 29· | |

So that, in whole numbers, we have,—

| | Base. | Height. | Slope. | |
|---|---|---|---|---|
| Great P. and 6 others | 40 | 25 | 32 | true within 1/1000 |
| Second P. and 5 others | 70 | 45 | 57 | " " 1/1000 |
| Small Dashoor P. | 75 | 45 | 59 | " " 1/1000 |
| Steepest Stone do. | 50 | 35 | 43 | " " 1/1000 |
| Flattest do. | 42 | 20 | 29 | EXACT. |

I have no doubt these were the proportions intended, and that by comparing the absolute measures, we shall have the Egyptian cubit or foot more exactly than any other ancient standard.

Mr. Drach, I see, has also referred Mr. Thirlell to Röber's identical solution of the problem. With regard to Röber's other theories, I shall believe they used the heptagon when any example of that figure shall be found in their works. It is rare enough in *any* architecture. An early window in St. John's Church, Winchester, has the only septfoil I know, in England or France, though fourteen seems now the established number of spokes for our hind carriage-wheels.

E. L. G.

## SPIRE OF ST. PAUL'S, BEDFORD.

A CORRESPONDENT says,—The tower and spire of this church are now taken down for re-building, in pursuance of the alterations agreed upon. The fine roof of the church had previously been well replaced from ascertained danger in 1848. In the case of the tower, it proved not a day too early; the symptoms of danger had appeared from large cracks, which had been too much slighted. Some Norman work was found, supposed to have been removed from the celebrated "Castle;" but the general masonry was about the worst Mediæval work ever known, the stones being held together by a muddy substance, with scarcely a symptom of lime, though not wanting in the neighbourhood; and it is a great wonder it could stand so long. A Bedford paper (alluding to a terrible crash elsewhere fifty years ago) suggests that this might be a useful hint towards the examination of other towers (which was most carefully done in the instance of St. Saviour's, Southwark, about fifteen years ago), where there might exist not unlikely danger.

## CLARE COUNTY LUNATIC ASYLUM.

THIS building, in common with the majority of those in Ireland the purpose of which is similar, has been erected on a site selected for its salubrity, most desirable for its command of cheerful scenery, and its convenience to the main road of the county, to accommodate the lunatic poor for whom it is intended.

The site consists of about 40 acres of land within a mile of Ennis, on the Gort-road, at the northern side of the town. The building faces the south, towards which the ground slopes gently. The character of the building is simple and bold, and suits very well for works of the class; there is a central tower of good outline; the windows generally are circular-headed, have plain square architraves surrounding them stopped on square sills. A little more finish is given to the central or official department than the rest, otherwise there is nothing striking as an architectural composition.

It consists of a front centre building containing the official residences and public rooms, two wing buildings for the patients, with two airing courts at the rear of each, and a rear centre building containing the dining-hall, kitchen, laundry, and other offices: the front and rear centre buildings are connected by covered corridors.

The extreme length is 600 ft., of which the front centre building occupies 80 ft., the wing buildings extend 200 ft. at each side, where they return about 100 ft., the remainder of the length being occupied by the infirmaries.

The extreme depth of the building at the centre is 330 ft., and embraces the kitchen and laundry offices, with the rear and front centre buildings. The day-rooms average in size 40 ft. by 24 ft. The dining and recreation hall is 56 ft. by 30 ft., and the height of two stories, with an open roof.

A series of day-rooms, on the ground-floor, dormitories on the upper floors, connected by passages of moderate width, have been adopted. It is thought, with the sanction of the Board of Control, which in Ireland takes the place of the Commissioners of Lunacy, that this arrangement in separating the day and night accommodation of the patients, and otherwise assimilating their circumstances to those of ordinary life, is preferable to the usual corridor, or "ward system," as it is termed.

The infirmary buildings are placed at the extreme ends of the wings, having yards and airing sheds: in connexion therewith they have also separate entrances and staircases.

At the rear, connected with the airing courts of the male wing is a working ground, with suitable carpenters', shoemakers', tailors', and other workshops, opening to the same; at the other side of the kitchen and stable-yard, and connected with the airing courts of the female wing is the drying-ground, communicating at one end with the laundry offices. Suitable sheds and latrines are provided for all the airing courts.

The front centre building, which projects about 50 ft. from the wings, is placed at a higher level, and with a terrace front, admits of a basement, in which the kitchens and offices for the physician and matron are placed.

The chapel, which has a vestry and separate entrances for male and female patients, is situated on the first-floor at the rear of the front centre building.

The ground-floors of the wings are chiefly appropriated for day-rooms and single-rooms. The day-rooms nearest to the centre, at each side, are for the tranquil patients; those more distant for the refractory. These latter are mostly intended to sleep in single rooms, situated in the returns of the wings. The refractory patients all through will be separated from the rest. The tranquil patients will sleep on the upper floor, chiefly in dormitories; and the middle class of patients will occupy the first or middle floor, where day-rooms and dormitories are provided for them.

The attendants' rooms are placed next the dormitories, with glazed doors between, and are in the proportion of one attendant to thirteen patients on an average.

The whole number of patients for which accommodation is provided is 260; and 25 ft. superficial are provided in the day-rooms for each patient, and 50 ft. superficial in the dormitories, the ceilings being 12 ft. in height.

Infirmary accommodation is provided for one-tenth of the whole number of patients, and single rooms in the proportion of 30 per cent. The water-closets, baths, and lavatories are placed together in projections, in order to simplify the arrangement of the drainage and water supply, and to keep those offices as much as possible separated from the inhabited apartments.

Two staircases with solid wells, waiting and reception rooms, together with side entrances for patients and their friends, are provided for each wing.

The kitchen, 33 ft. by 30 ft., adjoins a scullery and a boiler-house. The laundries and wash-houses are at one side of the kitchen court, and the kitchen stores and workshops at the other side with the attendants' dining-room and the female servants' rooms overhead. On the first floor of the range of buildings, having a separate entrance and staircase, are the storekeepers' rooms.

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The amount of the present contract, exclusive of boundary-wall, gate and other lodges, farm offices, baths, water-closets, and engineering works, is about 29,000*l.*; but it is estimated that when these additional works are completed, the total cost will amount to 35,000*l.* Mr. Michael Meade, of Dublin, is the contractor, and Mr. Fitzgerald clerk of the works. It is expected that the whole will be completed within a year from the present date.

## THE EAST INDIA CLUB, ST. JAMES'S-SQUARE.

THE East India United Service Club has just entered into possession of its new club-house. The old building, No. 14, St. James's-square, had long been found too small for the increasing numbers of the Club, and the members therefore decided to rebuild No. 15, St. James's-square, and add it to their former house, No. 14. Mr. Charles Lee was their architect. The façade is of an ordinary Italian type. The interior of the club-house has been fitted throughout with the conveniences supplied by modern ingenuity, and is to be handsomely decorated.

The East India United Service Club was originally founded in 1848, to meet the wants of the various services which collectively administer the Indian Government. It has, however, gradually lost its exclusively Indian character, more especially since the transfer of our Eastern Empire to the Queen, and it has now on its rolls many officers belonging to the home forces. The Club numbers upwards of 1,700 members, of whom generally about 800 are in England. The new building has been designed to accommodate over 1,000 members. The works have been executed by Messrs. George Myers & Sons; and the furniture was supplied by Messrs. Holland & Sons. Mr. Alfred Howard acted as clerk of the works.

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GREAT excitement has been caused by an association of building speculators having bought up a large tract of house property in the very heart of the city, for the purpose of pulling down the buildings and erecting new ones on the site. Some idea of the extent of this enterprise may be formed from the fact of no less than 987 families (comprising about 4,000 persons) having received notice to quit on the 1st of May. The premises in question consist of old tumble-down houses, situated in narrow lanes, blind alleys, and small courts, known by the euphonious appellation of the "Gängeviertel," tenanted by squalid inhabitants of the very poorest and most wretched classes, accustomed to the inconveniences of foul air and close but cheap quarters. The original plan was to make a public thoroughfare leading from the Grosse Bleichen to the Grossneumarkt, which was greatly needed, and would have proved a great facility for communication between two important quarters of the city; but for this purpose they required from the State a subvention of a million marks banco, as indemnity for the ground given up for streets 50 ft. wide, which was refused by the Legislature. Under these circumstances the projectors have altered their plans, and now intend to make private streets and courts, with which the authorities have no power to interfere. As the commerce and industry of the city are increasing annually in a most unparalleled ratio, so the population is ever growing larger, more particularly among the working classes, who are attracted from all parts of the interior of Germany and the surrounding countries by the high price paid for skilled labour at Hamburg. It cannot be denied that there is in consequence a great scarcity of dwellings suited for the requirements and within the reach of the working classes, and it will be apparent that this scarcity will be greatly increased on the 1st of May, when 4,000 persons more will be obliged to find other suitable lodgings. To obviate this dilemma to some extent, a provisional committee of patriotic and influential gentlemen has just been formed for the purpose of getting up a joint stock company, to be called "The Building Association of 1866," with a capital of 1,000,000 marks, in 2,000 shares of 500 marks each, for the purpose of building small houses and tenements suited for mechanics and their families, and to be let to them at rents giving a return of not more than 5 per cent. per annum. According to the prospectus issued, the company is to declare itself "constituted" as soon as one half of the shares are taken. The proposal seems to find encouragement, and is warmly supported by the better part of the local press.

## TEMPERANCE BUILDINGS IN THE NORTH.

*Sunderland.*—The advocates of the temperance movement in Sunderland are now making strenuous efforts on behalf of their cause, and are, on the whole, so generally successful, that the bold scheme of erecting a public building is now in a fair way of being realised. The building is to be erected at a cost of 10,000*l.*, and will be called the "Victoria Hall and Temperance Institute." It will occupy a good site at the north end of the Toward road, facing the new extension park, and easy of access to the public. The length of the building, which runs north and south, will be 260 ft., by a medium width of 75 ft., and in addition to containing a grand hall, with dress circle and gallery, capable of accommodating 2,000 people, will include a smaller lecture-hall, in which 600 can be seated, besides refreshment-rooms, club-rooms, anterooms, and news-room. The extreme north end is furnished with a clock tower, which will rise to a height of 160 ft. The style adopted is Gothic, and Mr. Hoskins, of Darlington, is the architect.

*Seaton Carew.*—The Temperance Society here have decided upon supplying a want long felt in this neighbourhood, by erecting a Temperance Hall on the site of the old Boat-house. Attached to the lecture-hall is a reading-room, &c., which will be used as a Mechanics' Institute. Mr. Hoskins is the architect. The building is of Early English character.

## THE PARIS EXHIBITION OF 1867 AND ARCHITECTURE.

SUCH of our readers as agreed with us in the expression of regret that architecture, notwithstanding the good and useful presence of Mr. Beresford Hope, was not represented by a professional architect on the English Commission in support of the coming Paris Exhibition, will be glad to hear that Mr. William Tite, M.P., has been added to the list, having been unanimously elected a Commissioner on the motion of Lord Granville.

## SHOP-FRONT IN NEW BOND STREET.

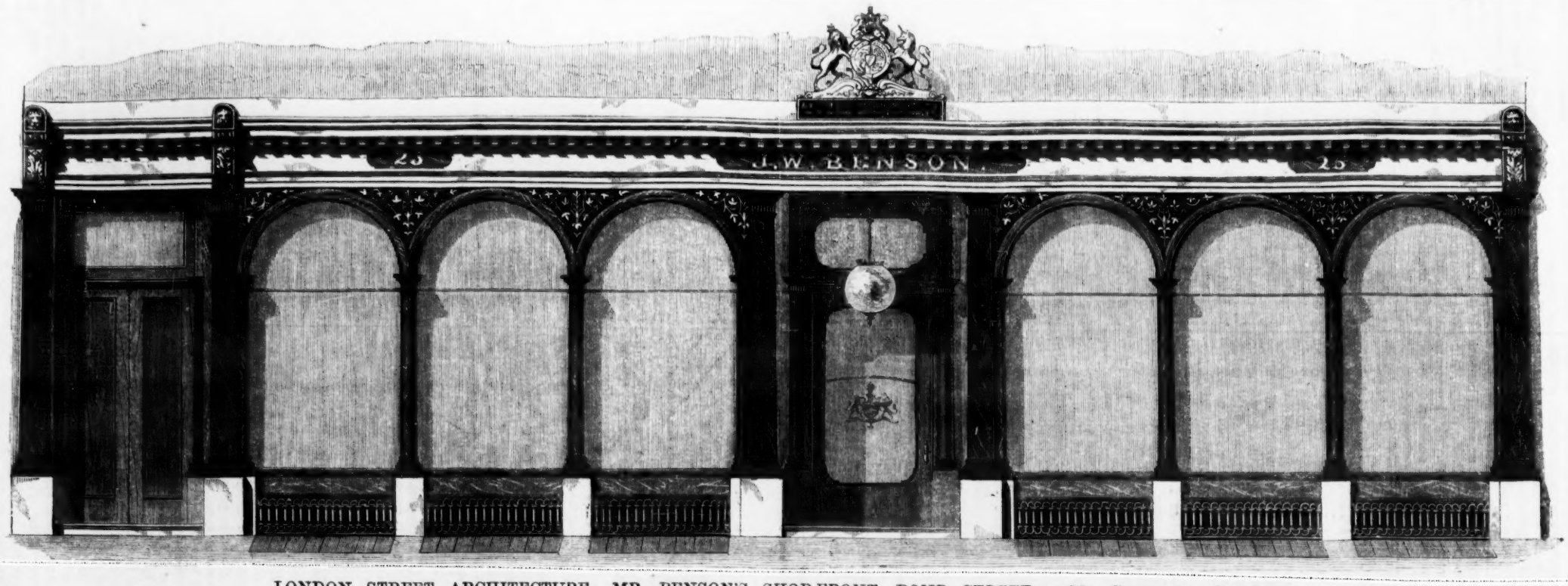
MR. BENSON'S PREMISES.

IN Bond-street, Old and New, several handsome shop-fronts have been recently erected. Comptroller Sir Thomas *Bond*, of Peckham, who built the first part of the street, on the site of Clarendon House, two years before the "Glorious Revolution" of 1688, and ruined himself by so doing, would not know it again. New Bond-street, as its title tells, came after, say 1721. In this part of the well-known thoroughfare, the latest of the alterations has been carried out by Messrs. John Drew & Co., of Hatton Garden, under the directions of Mr. Cockerell, architect, for Mr. J. W. Benson, of Ludgate-hill, the well-known watch and clock maker, at premises formerly the banking-house of Sir W. P. Call, Marten, & Co. Originally in all its arrangements essentially intended for private occupation, considerable difficulties were presented during the progress of the alterations, all of which, however, were of course surmounted.

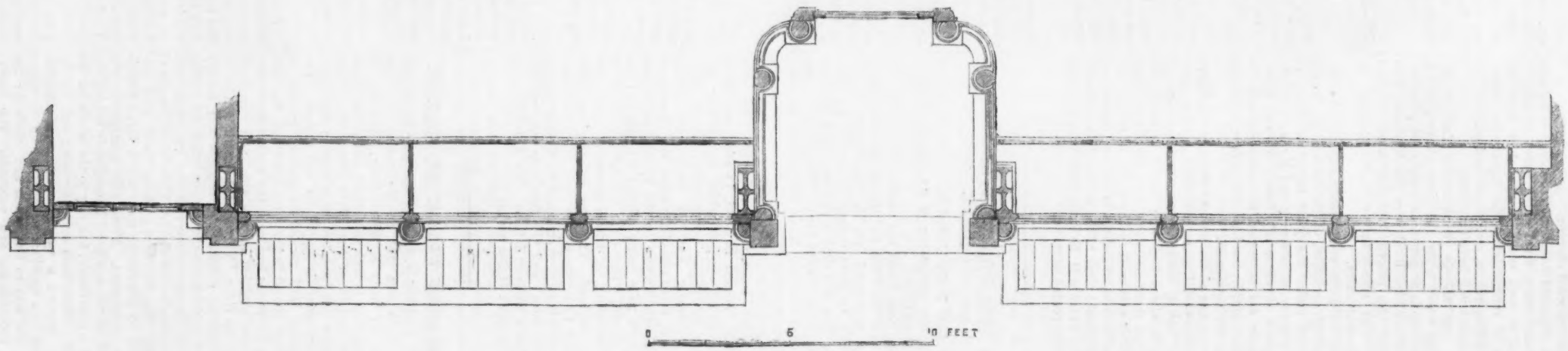
Those who knew the house before its alteration, will recollect the unsightly railings which guarded the areas in its front. These have been removed, and the area spaces covered over with York stone, supported by strong wrought-iron T bars, while light is admitted to the basement by means of six cast-iron horizontal frames, glazed with rough plate-glass. The whole of the brickwork, which occupied the position now devoted to the shop-front, together with the partition and party-walls inside have been cleared away, and in this operation good use was made of Drew's patent shoring needles. These walls have been replaced by strong cast-iron stanchions, which, secreted in the front, fixed on York stone templates, carry wrought-iron girders, 2 ft. deep, and 14 in. wide, running the whole length of the front, and cased in with tiles and mastic where not bedded in the wall.

The front itself, as seen in our illustration, consists of two windows, each 21 ft. long, divided by a spacious lobby, the floor of which is laid with encaustic tiles, with a margin of Sicilian marble. The entablature, extending along the whole length of the front, is of Portland stone, supported by columns and pilasters of Lizard serpentine marble, on rubbed Portland stone bases. These columns have fluted and gilt caps and moulded bases, the arches being also moulded, and the spandrels engraved and gilt. The frieze on the entablature contains black marble tablets, on which the name and number are cut in, and gilt. The front is illuminated at night by lamps placed in the shop above the inner cases of the windows, and is secured by means of Francis's revolving iron shutters, which descend behind the marble columns, so that these are still visible when the shop is closed. The entrance-lobby is fitted up inside with polished mahogany columns, and the stanchions supporting the girders are hidden by silvered glass, which also gives a light and handsome appearance to this portion of the front. The interior decorations of the walls and ceilings were designed and executed by Mr. Hatfield, of Marlborough-street, and are most tasteful and elegant.

The shop-front commends itself to attention by a design that avoids the cavernous insecure aspect of the majority of such formations, and by the richness of the materials employed.

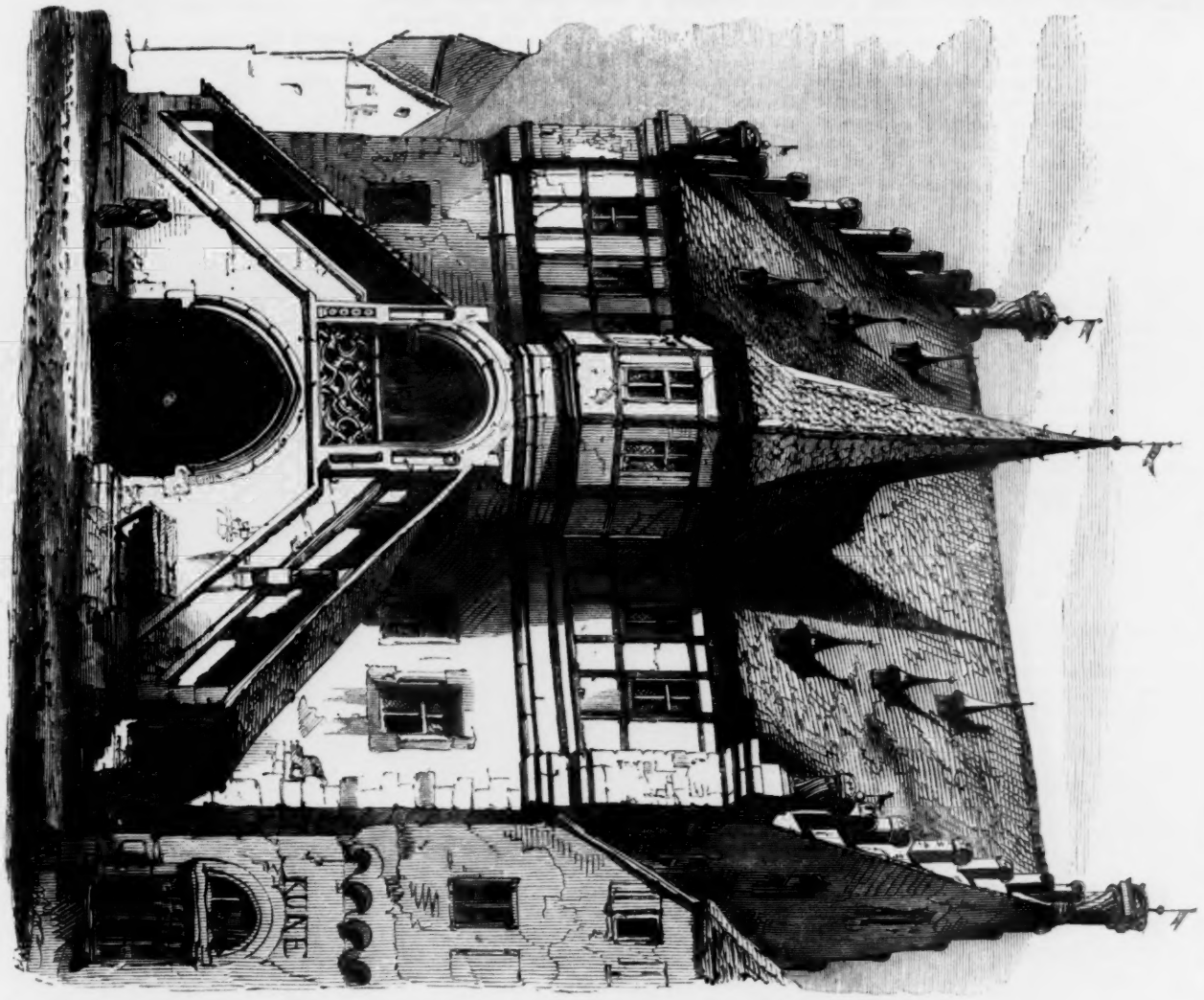



LONDON STREET ARCHITECTURE: MR. BENSON'S SHOP-FRONT, BOND STREET.—MR. COCKERELL, ARCHITECT.

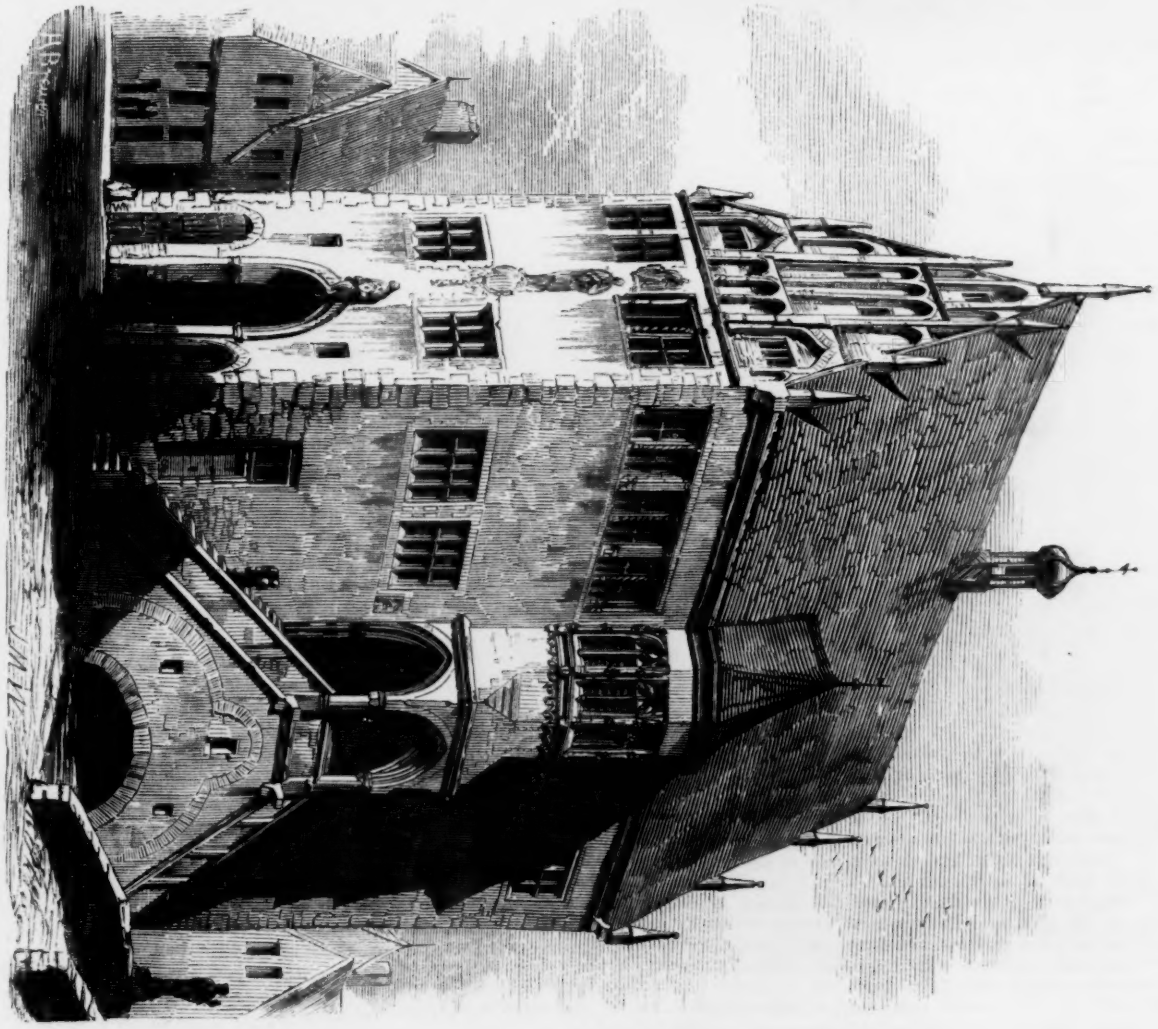



*Plan of Front.*

TOWN HALLS IN FRANCONIA.



*Rathhaus at Dettelbach.*



*Rathhaus at Volkach.*

## TOWN HALLS: FRANCONIA.

IN the most northern portion of the kingdom of Bavaria, called Franconia, is an ancient and exceedingly interesting town little visited by English travellers, and remarkable as having been the capital of one of the most wealthy ecclesiastical states in Europe previous to the general revolution at the commencement of this century.

Würzburg, although now reduced to the level of a provincial town, and shorn of most of its ecclesiastical splendour, is still a noble city; its cathedral, twenty-five churches, sumptuous palace, and delightful gardens, make it well worthy of a visit, and one of the most desirable places of residence in Germany. I do not, however, intend to occupy space with a description of Würzburg itself, but to make a few remarks upon a series of most interesting villages, or "dwarf cities" in its immediate neighbourhood. These towns or villages are all situated in the valley of the Main, and occur at about every two or three miles along the banks of that river, between Würzburg and Schweinfurth, a distance of about twenty miles. The first of these towns, starting from Würzburg, is Heidingsfeldt; it is a walk of about one mile and a half. The walls are tolerably perfect, and two singular gates remain, ornamented with the imperial eagle surmounted with an enriched Gothic canopy of fifteenth-century work. The streets are picturesque, and the parish church is a fine cruciform building with a Romanesque nave and tower. On the opposite side of the river is Randesachre, an unimportant village, with a Romanesque church, remains of an old Dominican convent, and some curious timber houses.

Passing Eiblestadt, Somerhausen, and Winterhausen,—which latter contains a fountain, surmounted with a bronze statue of a knight in full armour of the sixteenth century, and two grand stone houses of the same date,—Ochsenfurth is reached, one of the most perfectly preserved Mediæval towns in Germany. It is entirely surrounded with walls, protected by very lofty towers and gateways. There is a fine old bridge of very early date. The streets are singularly quaint; the houses all being built with projecting stories, supported upon stone corbels. The "Pfarrkirche," or parish church, in the centre of the town, is a noble fourteenth-century building, with a lofty Romanesque tower, and a beautiful Late chapel in the churchyard. On the east side of the Market-place is the Town-hall: on various portions of the façade are the dates 1497, 1498, 1499. The projecting clock turret, and external staircase, are pretty specimens of the architecture of that date.* The council-chamber, on the left-hand side of the principal entrance, is a fine old room, lighted by six large square-headed windows, very elaborately moulded; the ceiling is flat, and supported upon carved oak beams and stone corbels. This room, together with many others in the building, contains the whole of its ancient furniture: the tables are particularly good in design. In one room is a stove of glazed green tiles coeval with the building. The staircase is oak, and several of the upper chambers are panelled with the same material. At one angle of the building is a fine statue of the "Madonna," with the original lamp and bracket.

At the extreme west end of the town is a curious old hospital, of very large dimensions. It is a large rectangular building, with a tower and spire on its eastern side: it is a fine specimen of a Mediæval building of this class.

Two or three miles further on is Markt Biret, containing a curious street and gateway.

The next town, at a distance of about two miles from Markt Biret, is Sulzfeldt. It is a very small place, containing only 500 inhabitants; it is, however, entirely surrounded with walls, its towers and gateways remaining quite perfect. There is a Late church and rath-haus. Small as this place is, it still glories in the dignity of a town, and has its mayor and corporation.

Within sight of Sulzfeldt is Kitzingen, a large town, of about 7,000 inhabitants, with four churches—two Catholic and two Protestant. The Catholic parish church, rath-haus, and an old custom-house, are interesting buildings. The houses are chiefly built of stone, and many of them date from the sixteenth century.

The next place of interest is Dettelbach. In general appearance it very much resembles the former towns, except that it possesses more towers to its walls, and more gates, all perfect, than any of the others. The parish church is a very singular building, with an apse at both ends, and two towers on the south side, one square and the other circular in plan. They are about 10 ft. apart, and and connected at the top by a kind of wooden bridge or gallery. The interior of the church has been dreadfully modernized. The rath-haus is a very striking building. The entrance is by a double flight of steps, which lead to an open vaulted porch, the upper story of which is broached into an octagon, forming a very pretty little chapel. The council-chamber is in the upper story: it is a remarkably beautiful room. The deep-splayed windows are ornamented with carved medallions and wonderfully intricate interpenetrating mouldings. The ceiling is semi-hexagon in section, with arched principals and moulded purlins, without rafters. One or two other rooms are similar in general arrangement, but not so rich in detail. A river passes under this building from north to south, and a street through it from east to west, so that it forms a kind of covered bridge. Outside the town is an old Franciscan convent, with a Late Third Pointed church, in one span, with bold vaulting and a remarkable marble pulpit.

A few miles further along the river is another very interesting town, Volkach. Its gates are very remarkable. The outer gate is flanked by two slate-capped towers. This leads to the barbican, which is very large, and surrounded by a wooden gallery. Opposite to the outer gate is a lofty stone tower, through which the inner gate is pierced. The parish church, externally, is a good specimen of late fifteenth-century architecture. Internally, however, it has been entirely ruined with stucco and whitewash. The town-hall is remarkable for its singular resemblance to that at Dettelbach. It is, however, of later date, and far inferior in detail. Just outside the town are a series of "stations of the cross," leading to an old pilgrimage church. The first three of these "stations" are fifteenth-century work, and are very similar to the celebrated ones at Nuremberg. The church is a most interesting fifteenth-century building, with very rich details.

Volkach is about 14 miles from Würzburg; and I doubt if any 14 miles of ground in Europe contain so many interesting towns, villages, churches, and other objects of antiquity as these 14 miles on the banks of the Main. In my next letter I hope to give you a more detailed account of the churches in the towns which I have just described.

H. W. BREWER.

* We shall give a view of these in an early number.

## RAILWAY VIADUCTS.

INSTITUTION OF CIVIL ENGINEERS.

AT a recent meeting, Mr. John Fowler, president, in the chair, the first paper read was on "The Craigellachie Viaduct," by Mr. W. H. Mills.

This viaduct was constructed for the purpose of carrying the Morayshire Railway over the River Spey, at Craigellachie, Banffshire, the engineers being Mr. Samuel and the author. It consisted of three spans of 57 ft. each on the north bank, and one span of 200 ft. over the main channel of the river; ordinary boiler-plate girders constituting the former, and the latter being of wrought-iron on the lattice principle. The piers and abutments were of solid ashlar masonry, and the works were arranged for a single line of railway. It was stated that the Spey was one of the largest and most rapid rivers in Scotland, and was also subject to sudden and heavy floods, the water sometimes rising 6, 8, or 10 ft. in as many hours.

In designing the viaduct, it was necessary to provide an uninterrupted channel for the free passage of rafts, and to construct the piers and abutments so as to be able to withstand the blows and pressure from any blocks of ice, or floating timber that may be brought down during floods. The channel of the river was at ordinary seasons 180 ft. broad, and 4 ft. deep in the centre. The height to the underside of the girders from the usual water level was 20 ft. The bed of the river consisted of coarse gravel interspersed with large irregular boulders, overlying a compact layer of gravel and clay. A timber-pile cofferdam could not, therefore, be advantageously employed, and it was decided to use cast-iron cylinder foundations for the main pier, small river pier, and main abutment, and thick beds of concrete for the small land pier and abutment. The cylinders in the main pier and abutment were 5 ft. in diameter, and in the small river pier 4 ft. 3 in. in diameter. They were in two equal lengths, and formed, when bolted together, one complete cylinder 13 ft. 6 in. in length. Their size was sufficient to allow a man to work inside, the large boulders being broken up with wedges, and removed in pieces, with the excavated material. These girders were parallel throughout, and their depth was 17 ft. 4 in. The top and bottom members were T shaped, the width across being 3 ft., and they were composed of horizontal plates, a vertical plate, and four angle irons. A single system of lattice-bars was used for each girder, consisting of angle-irons varying in section according to position and relative strain. The main girders were 17 ft. apart from centre to centre, and they carried the railway on the lower flange. The cross girders were of wrought iron 12 in. deep and 4 ft. apart, the rails being carried upon longitudinal timbers bolted to the cross girders. The lattice-girders were held together laterally by five wrought-iron diaphragms, securely fastened to the main girders at the top, bottom, and sides. The lattice-girders and the plate-girders for the smaller spans were riveted together at the main pier, and formed thus one continuous system. At the main piers the girders were bolted down to the masonry, while at the other piers and at the abutments the girders rested upon turned cast-iron rollers.

The results of several experiments showed that the average breaking-weight of the plates was 22·39 tons per square inch, and of the angle-irons 24·16 tons per square inch. The effective sectional area of the bottom member, deducting for cover plates, rivets, &c., was 70 square inches, giving a tensile strain of 4·1 tons per square inch. The effective section of the upper member, without deducting for cover-plates, was 75·74 square inches, which gave a compressive strain of 3·78 tons per square inch. The total cost had amounted to 12,199*l.*, or equal to 29*l.* 10s. per lineal foot.

The second paper read was on "The Grand River Viaduct, Mauritius Railways," by Mr. W. Ridley.

It was stated that the length of this viaduct, from abutment to abutment, was 620 ft., and that this distance was divided into five openings of 116 ft. each in the clear. The height from the level of the rails to the surface of the water was 129 ft. 9 in. Each pier was composed of two cast-iron cylinders, each 10 ft. in diameter, resting upon masonry foundations, and filled with concrete; the works being for a single line of railway. Mr. Hawkshaw was the consulting engineer to the government of Mauritius, and the contractors for these railways were Messrs. Brassey & Co., for whom Mr. Longridge acted as resident agent. In constructing the piers of this viaduct, cylindric rings 9 ft. high were divided into five segments each, and were bolted together by internal flanges. It was resolved that the foundation should be formed of blocks of concrete, and that sufficient excavation for one block only should be taken out at a time. Tarpaulins were laid in the bottom, and for 4 ft. up the sides of the excavation, for the purpose of preventing the numerous springs of water from washing out the cement; and this plan was found to answer perfectly, five distinct blocks being thus successively laid.

The segments for the first rings of each pier were lifted into their places by means of sheer legs and tackle, and in two cases the second rings also; but subsequently a mast, with a cross-tree and struts, mounted on a frame inside the cylinder, and free to revolve easily when required, was employed. As each ring was completed, the mast, with its supporting frames, was lifted, the time occupied in effecting this being about four hours and a half. Eleven pairs of rings were thus placed on No. 1 pier, thirteen each on Nos. 2 and 3, and ten on No. 4. The heights to the top of the last ring on each pier were respectively 99 ft., 117 ft., 117 ft., and 90 ft. The weight of each segment lifted was 32 cwt., and one set of men in one day completed one ring and raised the mast.

Piers Nos. 1 and 4 were filled with concrete from the adjoining abutments. A single contractor's rail, weighing 23 lb. per lineal yard, rested on two frames, that on the abutment being higher than the one on the pier, and on this rail a box with a false bottom was made to travel, by a sheave rolling over it. The box contained 7 cubic feet, and weighed, when filled, 8¼ cwt.; as soon as the contents were discharged, the box

was drawn back by a rope. At piers Nos. 2 and 3, the concrete was lifted by means of an endless ladder, of iron, worked by a small engine. At every alternate joint was fixed, by angle pieces and diagonal stays, a light deal shelf, sufficiently large to hold a basket containing nearly a cubic foot of concrete. When these baskets arrived at the tops of the piers, they were lifted off and emptied, and were returned on the undersides of the shelves. By the former method 50 cubic yards were completed daily, whilst by the endless ladder about 40 cubic yards were deposited in the same time, with one hundred men working at each. The concrete was carried to a height of 3 in. above the tops of the cylinders, and consequently bore the whole weight, the cylinders merely serving the purpose of a casing, and preventing the concrete from crushing laterally.

The girders were sent from England in sections of about 12 ft. long, which on arrival were transported to the Mahébourg side of the river, and were riveted together in lengths of 36 ft. to 48 ft. A gullet was here excavated to the level of the abutment, and extending backwards to a distance of about 280 ft., it then rose at a slope of about 1 in 5 to the formation level. In this gullet the first lengths of girders were to have been built, and as they were pushed forward, the succeeding sections were to be brought down the incline and added on. The arrangement for launching the girders was, however, considerably modified in England; but this modification, simple and effective as it appeared to be, and good as it was theoretically, practically proved a failure, and eventually had to be abandoned. The original plan was then resorted to. A line of flat-bottomed permanent-way rails, laid on longitudinal timbers, resting on cross sleepers, was placed under the centre of each girder. At every 12 ft. a balk of timber, forming a skid, was placed transversely across the rails, and the girders were wedged up upon these balks. On the undersides of these balks, and over that part which would bear upon the rails, a thin plate of iron was fixed by two bolts, the heads of which were flush with the surface of the top, whilst the nuts projected underneath, and came up close to the inside edges of the rails, acting as guides to keep the girder in line when travelling. When the girders were ready to be moved, the rails were well greased, and men were placed at the ends of each skid with sledge-hammers to keep striking it to prevent sticking, as well as to assist in starting. The rails were laid throughout the gullet, to within 5 ft. of the face of the abutment, the underside of the rails being level with the surface of the masonry. When the skids arrived at the end of the rails, they dropped, and were removed. On the top of the bed plates the bearing plates for the permanent expansion rollers were bolted. These plates were tapered off at the ends, so as to allow the rollers to enter and to pass freely in and out. The latter were linked together, and after they travelled over, the plates were taken out and returned, and linked on to the rollers just entered, and were gradually drawn in under the girders. Short keel-pieces were followed up on the rollers, as the girders advanced, by men stationed on a scaffold. The launching was accomplished by means of powerful tackle and winches, and so effectual that in one day the girders travelled 12 ft. every fifteen minutes; subsequently they were advanced 108 ft. in four hours, and the last span was completed in six hours and twenty minutes, the entire length of the girders, 630 ft., moving quite freely. The roadway girders, plates, and permanent way were then laid, and in fourteen days after the launching was finished, trains were running over the viaduct. The girders were fixed to the centre pier, while they rested upon rollers at the other piers and at the abutments, and so were free to expand and contract. The total weight of the superstructure was 560 tons, of which the roadway weighed 147 tons; and the total weight of ironwork in the piers, including bed plates, expansion rollers, &c., was 993 tons.

## THE OAK.

THE oak, when well grown, is the largest and most majestic of all British trees. Viewed either as an object of gigantic and rugged beauty in our forests and woodlands, or, when felled, as timber of the utmost utility and endurance for public buildings, ships, &c., it is second to no other native tree. It has always been the delight of the landscape painter to introduce this tree in the woodland prospect, and to all lovers of nature it presents an unceasing and ever-varying charm; whether seen in the calm summer, with herds of deer reposing under the shade of its ample branches, in the driving storms of autumn and winter, with its contorted branches covered with snow, or its entire structure reduced to a gigantic shell, it is always an intense object of interest to the artist. Nor to the landscape artist alone has it been a subject of study and attention, but from the earliest times we find the sculptor, the ornamentalist, and stone carver representing in detail its foliage and fruit.

In our cathedrals and churches, in boss, finial, capital, and truss, we constantly see plaited and intricate groups of the leaves and acorns of this tree. There are very few large oaks to be seen near London, and for one to fully realise the immense size this tree will sometimes attain, a visit should be paid either to Sherwood or the New Forest. Here they may be seen in all their varieties of growth, their enormous spiral trunks seeming to form an inseparable part of the earth from which they spring. their huge twisted limbs and bright green foliage forming a prospect never to be forgotten. One of the most striking features in the general aspect of the tree is its irregular writhing branches (one of which has been known to weigh more than 5 tons), often reaching to within a few feet of the ground:—

> "Twined and twisted,
> Finger'd and fisted,
> Like one who had look'd on wringing hands
> Till his hands were wrung in his sleep."

But how many plain things are there intimately connected with the oak tree, wholly ignored by sculptors and decorative designers,—things valuable and characteristic in themselves, but passed over by those who have "eyes and see not!"

Foremost are the two distinct forms of oak,—one with the acorns without stalks and the leaves with stalks; the other with the *acorns* supported on stalks and the *leaves* without them,—the latter *Quercus pedunculata*, and the former *Quercus sessiflora* (misprinted by Gwilt,* who evidently copied it from some old botanical book, and mistook the long "s" for a "j," "*jessiflora*.") Now, as all oaks belong to either one or other of the above forms, we imagine it would be correct to indicate a knowledge of this simple fact in any work of ornamental painting or sculpture. The flowers that precede the acorns and grace the tree in the early spring seem uniformly set aside, though well worthy of examination for their artistic merits. The observer of small things who may have wandered in our oak forests at the fall of the year, has probably noticed the falling acorns rattling in every direction as the trees are shaken by the autumn winds. Amongst the dead leaves of this season the fruit readily germinates, and is then worth examination. The shell splits, and the moisture of the earth causes the first rootlet to emerge from the acorn. This rootlet is fiery crimson, tipped with transparent creamy white, and is an object well worth observing.

The only true English flowering parasite,—viz., the semi-succulent mistletoe,—sparingly occurs on this tree. It graces the tree at all seasons, flowering in the spring, and bearing its white berries in the autumn and winter. It is said that the mistletoe gathered from the oak was the only kind used by the Druids in their religious ceremonies. This may be the case, or it may not; but, at the present time, the parasite is far more common on other trees. It has seldom been sculptured as an ornament for the Christian Church, as being a relic of former idolatry, and is seldom or never used (on very slender grounds) as a Christmas decoration for our churches. It, however, occurs as an ancient sculptured ornament in Bristol Cathedral.

That there was considerable foundation for the many old tales of magic connected with this tree, a knowledge of the natural history of the oak itself sufficiently proves. At certain times and under special conditions, this tree might certainly be regarded by the credulous as truly "enchanted."

One of the most singular of these peculiarities is the growth of the remarkable fungoid excrescence known as *Fistulina hepatica*, so called from its very close and often startling resemblance to a great lump of liver hanging from the side of the trunk. It resembles a huge liver in every respect; the colour is precisely the same, and, if incised, a red, blood-like juice profusely flows from the wound: but not only in outward aspect is it a counterpart of flesh, but in its taste and meat-like qualities it so resembles meat, as to be nearly the same thing. It is esculent and nutritious, and has been aptly compared by a competent authority to a "vegetable beef-steak." It grows on all parts of the trunk and exposed roots. When very young it is exceedingly like a strawberry: and so close is the similarity, when growing on the roots, that the specimens might be readily mistaken by the most observant. In its next stage it is about the size of a large tongue, to which it bears a great likeness; so that the expression of "tongues in trees" would no longer be a figure of speech to the wanderer in an oak forest. The hurricanes of winter will sometimes blow a gigantic oak bodily down, if exposed to the fury of the wind, and will either tear it out partially by the roots, or snap it off close to the ground. Should the tree be alive, this broken part of the stem is just the *habitat* the above plant loves, on which it readily grows, and generally in great profusion, closely similating the viscera of some gigantic animal, with the red, blood-like juice trickling over the broken and ruptured trunk.

It would be out of place here, as well as difficult, to give a list of all the creatures to be found on the oak tree alone, or in oak forests, owing to their large numbers; but the lover of nature and art would be at no loss if he made the subject his study. The well-known gall, however, may be mentioned here, so common on oak-leaves; living and dead, and so like a ripe red cherry in colour and size when matured. At first it is yellowish green and succulent, ultimately becoming tougher, exceedingly brilliant in colour, and large in size. The curious, if not otherwise engaged, may find the creature inside that forms this parasitic gall of the oak, and the parasite of the second degree may be found in the home of this parasite of the first degree. From the above it will be seen that in any ornamental composition where the oak is figured there need be no lack of brilliant colour. If another instance is wanting, reference might be made to the spawn of *Helotium æruginosum*, so common on old dead oak branches; it penetrates and stains the wood in every direction, and entirely through from one side to the other, and is verdigris green in colour, of a particularly agreeable shade. It was once in considerable request amongst cabinet-makers, under the name of green oak, for the so-called Tunbridge ware; but now, although equally abundant in oak woods, it appears to have fallen into disuse.

In large capitals, and in masses of sculpture where plants are introduced, how cold and vapid does all appear where the sculptor has confined himself to a mere copy of a few flowers and leaves without tale or meaning, and showing no knowledge whatever of the things beyond a mere dead copy of form or colour. It is true that no common tree or weed grows in this country but tells some instructive tale to the observer of its life and uses, either valuable or dangerous; or of the things that live upon it.

We might fill this number of the *Builder* with a list of the associations of the oak tree, its use for building houses, ships, and many other things,—its bark used for tanning, its fruit formerly used as food by the ancient Britons, the fondness of hogs for the acorns, the hunting for truffles in oak forests (with hogs on the Continent, and with dogs here), and numberless uses of this tree, dead or alive. W. G. S.

* "Encyclopædia of Architecture," page 482.

## THE ARCHITECTURAL ASSOCIATION.

THE usual meeting of members was held on Friday evening (the 16th ult.), at the House, in Conduit-street.

The chair was occupied by the president, Mr. R. W. Edis.

The following gentlemen were elected members of the Association:—C. J. Jones, Robert Stephenson, and Robert Brass.

Mr. Frederick Farthing was, on ballot, elected registrar and collector of the Association.

Mr. J. T. Lyon read a paper entitled, "Points of essential Difference between Creative and Imitative Art." Having explained the distinction between the words "creative" and "imitative," he proceeded to point out the fallacy of comprising decoration with ornamentation, which, so far from being convertible, were really and significantly different. Decoration and orna-

mentation might be carried out in three ways, either by simply creating, by creating and imitating, or simply by imitating. It seemed to be a law that everything which man created ought to be made with due regard to order. Order was the first essential of creative art: in pure imitative art it was, however, just the reverse. Disorder was an essential feature of imitative art. All architectural works were based on the law of order; and the same law seemed to have been carried out in the best works of art of all ages. It was by the combination of creative and imitative art that the highest perfection was to be gained, but the confusion of the two led to the most mischievous results. The character of a nation, so far as art was concerned, might be ascertained from the commonest works of everyday-life. In the block letters used by tradesmen over their doorways, the principle of falseness in art was carried to an extreme by the shading and perspective of the letters. In such cases there was a confusion of creative and imitative art which was never allowed to exist in any other age but our own. In support of these views he directed attention to drawings of vases, scrolls, &c. He considered that this confusion was much to be deplored. He did not believe that the people of this country were indifferent as to whether they were to have good or bad art. On the contrary, he believed they only required the necessary art education to make them love good and true art. It was probable that in many cases some sacrifice of beauty might be made in attempting to adhere rigidly to true principle; still, truth was of greater consequence than beauty. He expressed his surprise that the word "distorted" had not been applied by art critics to flat painting, and referred to Japanese, Egyptian, and Greek art to show the extent to which distortion was carried. He subsequently referred to the laws which should govern the artist in stained glass, and pointed out the error of attempting to make pictures through that medium. In conclusion, he combated the common idea that principles might differ because tastes might disagree. All art was based upon the principles of truth, and those principles had governed the artists of all ages and all countries.

In the course of the discussion which followed, Mr. Lewes said, he could not agree in thinking that creative art required bad drawing and distortions.

Mr. L. W. Ridge thought that the principles communicated by the author of the paper had the advantage of being in a low condition at present. He was of opinion that the great object was to draw a distinction in sculpture and painting between pictures and decorations. Every one admitted that the statues set up in the streets of London looked extremely uncomfortable, and he thought it would be better to put backgrounds to them, if possible. They should remember, that in creative art decorations were required for particular purposes, and that therefore simplicity should be studied. Creative art appealed, on that ground, to favourable consideration.

The Chairman thought that, with regard to the question of creative and imitative art, they ought not to go back to the days of Japanese and Egyptian art in all their abominable distortions. The beauty of all descriptions of art consisted in its being as near truth as possible. The man who undertook to design creative art, whether in the round or flat surface, should have the love of nature to inspire him.

## REMEDY FOR DAMP WALLS.

THE late rains have penetrated the walls of hundreds of houses, and we have received more than our usual number of letters, asking for a preventive,—generally not easy. We printed one such letter last week, but have received no fresh statement of experience of any particular remedy in reply to meet the demand. We repeat a recipe given before in our pages, concerning the value of which very strong statements have been made, especially, however, with regard to its use on brickwork. We should be glad to hear what has been the result of its use on stonework:—

Three-quarters of a pound of mottled soap to one gallon of water. This composition to be laid over the brickwork steadily and carefully with a large flat brush, so as not to form a froth or lather on the surface. The wash to remain twenty-four hours, to become dry.

Mix half-a-pound of alum with four gallons of water: leave it to stand for twenty-four hours, and then apply it in the same manner over the coating of soap. Let this be done in dry weather.

FROM the most remote records we learn that the old-established and appointed marks which defined the limits or boundaries of properties were preserved with almost sacred care. In the Scriptures a punishment greater than that which can be inflicted by mortal hands is threatened to those who remove their neighbours' land-marks.

As regards the boundary lines of states and nationalities, they have from the earliest days been a source of difficulty and the cause of unceasing disputes, often settled by the spilling of seas of blood. In connexion with great countries nature has marked out the limits, which seem destined—for a time at any rate—to have peculiar interests and to require separate forms of government: the ranges of mountains, the courses of important rivers, the interposition of deserts and sterile plains, the girdling of the sea have had the effect, in a measure, of determining the outline of nations, and also of establishing the peculiarities of language. In our sea-bordered land the general boundary is distinct. There are, however, outlying islands away from the main shores of Great Britain and Ireland which might admit of dispute; but even at home the pages of history, and the careful observations of the antiquary, will show the difficulties we have had respecting boundary lines which formerly defined the territories of kings, most of whom were fighting and struggling for an extension of their power and rule: fortunately those days of internal strife have passed away, and the numerous points once fortified with castles and barriers have become the peaceable marks which divide county from county.

Nor are the boundaries of boroughs, cities, and estates without a considerable amount of importance. These also have been and still are matters not easy rightly to establish. In England, Doomsday Book did much to define the extent of the Church and other lands; but when there were no water-courses or ranges of hills, stones of peculiar form, trees of great antiquity and size, and other striking natural objects were selected; and as time rolled on other stones were placed and inscribed which caused the bounds of estates to be more clearly seen. All this was only done after many a quibble and feud; but now, owing to the labours of land surveyors, and to the engraving of the Board of Ordnance maps, we shall have the bounds of even small properties so clearly established that it will be impossible for lawyers themselves to differ on the subject.

In former volumes of the *Builder* there is reference made to stones placed in various parts of the metropolis which mark the outlines of parishes and record various events. Many of these, which have use as well as interest, are in a state of neglect and decay; and if a little attention be not directed to these objects, it may be necessary to resort to the old custom of thrashing certain of the school-boys at different points of the debateable lands, in order to fix these points in the memories of the rising generation. To some extent the amalgamation of the small city parishes and the provision of plans on a large scale will, in course of time, render those marks less necessary: they will always, however, be objects of curiosity.

Throughout the country there are land-marks which have been useful for the direction of wayfarers, many of which have been renewed from time to time during several generations. Amongst these are "finger-posts," which are placed at the junctions of cross-roads and in other situations where an indication of the way and distance to surrounding places is of the greatest value to the pedestrian, especially in parts of the country where the population is thinly scattered. As the turnpike-roads became more frequented, the guide-posts were placed in greater numbers, and for the most part they were kept clearly painted and in good repair. The mile-stones became also of value, not only to the foot, but also to the stage-coach and carriage travellers.

To note the decrease of the number of miles to London, or to some other termination of a journey, in the old days of travelling, often beguiled the time; and they are, even now, of value to those who still in considerable numbers keep to the road. We do not know the date at which mile-stones were first brought into use; but we have not noticed any of the lettering which seems older than the time of George I. or George II.'s reign. Those marks which were cut upon the stones most readily procured from the neighbouring quarries, were more or less perishable, and many became speedily defaced and unreadable. At the beginning of the present century, more permanent materials were provided for this purpose. Some were formed of slate, into which raised letters and figures of metal were placed. Others were made of cast metal altogether; but these seem to have been often cracked, and in other ways damaged by mischievous people; and in many directions now the mile-stones have been allowed to fall into a very bad state, and are far more difficult to decipher than inscriptions of Anglo-Roman time. Finger-posts, for the most part, are even in a worse condition: the indicators are often broken, and the paint is allowed to perish from the effects of the weather, and in consequence of the want of a little timely renovation. This is not an expensive work, and would be an aid to many of those poor travellers who, in larger numbers than might be generally supposed, still wander along the public roads.

In Denmark, where railways are only beginning to spring into existence, the roads are excellent, and the distances are marked by handsome mile-stones;—a small round pillar, on a pedestal of granite, resting on a square green mound of earth, the front of each shows the number of miles; while over it, in colours, is the king's monogram surmounted by a crown. The finger-posts for the cross-roads are also very substantial and in good taste. A bronze column supports a post of the same metal, on which, in large golden letters, is displayed the name of the town or village indicated. A little attention should be given to the mile-stones and finger-posts still standing in England.

ARCHITECTURAL INSTITUTE OF SCOTLAND.—A meeting of the Architectural Institute of Scotland was held in the Royal Exchange, Edinburgh, on the evening of Monday, the 26th of February, when the report by the council in regard to the Lord Provost's proposed sanitary improvements in the city was read, and the plans of the proposed alterations were exhibited.

## PARIS SEWERS.

M. DUMAS, president of the Society of Encouragement, gave at one of the last meetings an account of the sewerage works undertaken during the last years by the municipal administration of Paris. The main project comprises two great collector sewers, one on the right and the other on the left bank of the Seine, both uniting so as to have a common outlet into the river at Asnières. The first of these is terminated; the second is nearly so; there only remaining 300 mètres to be completed. This could have been finished long ago but for the indecision of the engineers as to whether or not the drainage of the Pantheon-hill would be continued by the Rue Saint Victor, as proposed at the commencement. Now, it has been arranged that the drainage will follow the Rue des Ecoles, so that the 300 mètres above alluded to can be put in hand and completed by August of this year.

The inhabitants of the river shores at Asnières have complained—not without reason—of the emanations arising from the outlet of the sewer, but the cause of complaint will be removed when the second part of the programme of the Paris drainage is executed. This is to consist in the establishing of a weir down the river, the effect of which will be to raise, in the interior of the town, the level of the Seine to 1 m. 50 c. above the *étiage*, or present lowest level, and thus to prevent the emanations produced during the dry days of summer. This barrage will have also the effect of diminishing the number of days during which the navigation of the river is annually stopped for want of water, while it will serve to create a motive power of 1,000 horses, capable of lifting the discharge of the Asnières sewer to a higher level, whence it can be distributed to a distance, either as liquid manure, or for the silting up of some waste lands.

M. Dumas also drew attention to the analogy between London and Paris relative to the sewage, that of London being the most difficult to deal with, containing as it does solid matter as well as surface drainage. He remarked that, by a curious coincidence, the English engineers appointed to study the question, had arrived at a conclusion identical with that of the Paris authorities. In both cases a collecting sewer has been constructed at each side of the river: in London, the products will be carried by a common channel to the neighbourhood of the sea; in Paris, they will be conducted to a region which, though fully determined upon, M. Dumas excused himself for not divulging.

## GERMANY.

*Prussia.*—A day or two before the close of the old year, one of the most ancient feudal castles still extant, was destroyed by an accidental conflagration; for a fire broke out in the roof of Putbus Castle, the family seat of Prince Putbus, situated in the island of Rügen, lying off the Prussian coast in the Baltic. It was celebrated for containing many valuable relics of the Middle Ages, among which was a large collection of carved works of art in gold, silver, wood, and amber, large quantities of the latter commodity being annually cast up on that exposed coast, and though now claimed as royal property, were for many centuries the exclusive perquisites of the princes of Putbus. The original building was constructed for defensive purposes, and has successfully withstood many attacks and sieges on the part of the Sea Kings, Vikings, and other predatory hordes of the then formidable Norsemen, but the castle had been lately renovated and embellished by the father of the present owner.

*Wurtemberg.*—A favourable crisis in the long-projected restoration of the beautiful ancient Gothic cathedral at Ulm, on the Danube, has taken place by the vote of the Second Chamber, granting the Government a sum of 50,000 florins (about 4,200*l.*) for that purpose. The sum is to be applied in the first instance to the west front of the tower, the restoration of which was commenced some twenty years ago, but soon after given up for want of funds; and secondly to the fundamental repairs of the roof of the choir, which is in a very dilapidated and unsafe condition. These are just the works considered as most pressing, and strongly recommended in the report made by the architects, Schmidt, of Vienna, and Denzinger, of Regensburg, who were officially consulted on the subject.

*Stuttgart.*—The lately-endowed Professorship for Engineering Science at the Polytechnic School has been given to Herr von Kaven, professor of architecture at Hanover, with the rank and title of architectural councillor (Oberbaurath). It is, however, understood, that he will only enter on the duties of his new appointment in the course of next summer.

*Baden.*—The new Hall of Industry (Gewerbe-Halle), at Carlsruhe, will be opened in May. This institution is formed for the double object of exhibiting to the public all the latest technical improvements in the various branches of mechanical industry, and containing a collection of articles of raw produce of different countries adapted to manufacturing enterprise, but little known in Germany. There will also be a public library, as well as a permanent exhibition of the newest inventions in machinery and tools calculated to economise manual labour.

*Frankfort.*—The principal street, known as the "Zeil," is to be considerably lengthened, for which purpose several blocks of old houses will be removed. The expense of this projected improvement is estimated at two millions of florins, or about 170,000*l.*——An agreement has been entered into between the senate and the French engineer Kind, of Paris, who for the sum of 150,000 florins undertakes to sink an artesian well in the principal square, to supply the city with pure water, the want of which has long been inconveniently felt by the inhabitants.——The trustees of the Staedel Institution invite architects to send in designs and plans for a new picture gallery, to be erected on the ground now occupied by the Zoological Gardens.

## THE MINERAL OIL MOVEMENT.

A REPORT has been made in New York to "the Petroleum Light Company," by Colonel Julius W. Adams, engineer, as to experiments made on the use of petroleum as fuel, in combination with steam, for the heating of steam-boilers. Mr. Cyrus Field, Mr. Horace Greeley, and other gentlemen witnessed the experiments, which have been carried on for some months, and are considered to be satisfactory. The oil and steam are conducted to a mixer, or retort, adjoining the furnace-burners beneath the steam-boiler, and are there mixed before passing through the burners, which are ninety in number and small in size. The oil and steam are entirely under the control of the attendant, and can at pleasure be made to extend to a volume of flame, filling the furnace and large flues with flame, or reduced to the flicker of an expiring lamp, by the mere turning of a tap. From the time of admitting the oil into the pipe-coil, steam was raised in the boiler, at atmospheric pressure, in twenty-nine minutes. No smoke or unpleasant smell was perceptible, and the combustion was complete and entirely manageable. To determine the precise economic value of the oil as fuel in comparison with coal, further experiments are considered to be necessary; but the evaporating power of the oil is found to be in the ratio of 29·33 to 8·16, or 3·6, weight for weight with coal. The advantages of the oil as a fuel for marine engines are thus summed up:—

"Rapidity with which steam may be raised—reduced dimensions of boiler and furnace below that required for coal—the continuous firing effected by feeding the fuel through a pipe into the furnace, thereby preventing the great loss of heat in the furnace every time a fresh supply of coal is thrown on, and the rush of cold air upon the opening of the furnace-doors—the freedom from smoke, cinder, ash, or refuse of any kind, which in coal reaches from 7 per cent. to over 16 per cent. of the whole amount. In the ability to command a forced fire almost instantly, without a forced draught, which, under some circumstances at sea, is of vital importance. In dispensing with the numerous class of coal-heavers, stokers, &c., and all the inconvenience of raising clinkers and ash from the furnace-rooms; and, finally, the diminished space occupied in the storage of the fuel."

There is a district in Scotland, west of Edinburgh, which now goes by the name of "the Scottish petrolia." It consists mainly of oil-bearing shale. Bleak upland farms have been found to be mines of wealth, estates at one time unsaleable have realised fabulous prices, and quiet rural villages have suddenly found themselves growing into important mining centres. Foremost among the men who have profited by this new industry, of course omitting the inventor of the process, Mr. Young, who has just retired with a fortune, is Sir James Simpson, who is reputed one of the most fortunate men of the day in the success of his commercial enterprises, in several of which he has embarked money. In one concern in which the fortunate professor is engaged, and which is reputed to have made its capital several times over in a year or two, one of the partners is also owner of the property, getting a lordship of 2s. 6d. on every cartload of the valuable stuff lifted from his ground. Everywhere in the district the landowners are boring in search of the precious strata, with variable success. A little property was inherited, which sold for something under 2,000*l.*, just before Mr. Young had tapped the district. This bleak bit of moorland is said to be now worth 200,000*l.*

## THE TRADES MOVEMENT.

*London.*—A crowded meeting of operative engineers employed in the districts of Poplar, Limehouse, and Blackwall, has been held in furtherance of the movement for an advance of wages. Upwards of 1,000 society and non-society men were present. The chairman said the object of the meeting was to ascertain whether the men in the eastern districts were prepared to co-operate with the other districts in requesting an advance in the present rate of wages, and, if so, to what extent they were willing to go. A resolution for an advance of 10 per cent. on the present rate of wages was passed and ordered to be sent to an intended aggregate meeting as the opinion of the eastern districts.

*Birmingham.*—A general meeting of employers in the building trades of Birmingham has been held, Mr. Cresswell presiding over a large assemblage, at which all the leading firms were represented. Notices of alteration of rules submitted by the various workmen employed in the trade had been printed and circulated amongst the members of the association. The carpenters and joiners, bricklayers, house painters, masons, and labourers all claim an advance of wages or a reduction of the hours of labour, or both. A report was read which recommended that, under the provision of the present rules, the demands made by the carpenters and joiners, bricklayers, and labourers, be referred to arbitration. That in reference to the notice given by the operative painters, the committee understand that the master plumbers, glaziers, and painters have had a meeting on the subject, and recommend that the secretary be instructed to open communication with their secretary, with a view to take common action in the matter. As the notice from the masons had only lately come to hand, the committee recommended that the consideration of it be postponed until Monday, the 19th March next. The report was received and adopted unanimously, and the committee was authorised to carry out their proposal of a reference to arbitration.——A case of intimidation in the building trade has been brought before the Birmingham police-court, when Wm. Carrol, secretary to the Birmingham Operative Labourers' Society, was committed for six weeks' imprisonment for having threatened Mr. Robert Harris (firm of Harris & Price), builders, that unless Kelly, a non-society man in their employ, was immediately discharged, all their other men should be made to leave, which threat he afterwards carried into execution.

*Manchester.*—Several of the members of the building trades in this city have given their employers notice for an advance of wages this spring, and in one instance, that of the stonemasons, for a reduction in the hours of labour, namely, to stop working at 12 o'clock on Saturdays, instead of 1 o'clock, as at present. The employers say they find themselves in a very difficult position. They are hampered and embarrassed with trade regulations as to number of apprentices, largely-increased payment for overtime, and many other vexatious rates that check the carrying on of their business with either pleasure or profit. They allege, too, that architects are rapidly introducing more labour into their designs. A large meeting of the masters throughout the country is, we understand, to be held in Manchester next month, with a view to adopt some common action in the way of resisting further encroachments. It is to be hoped, however, that a strike will be avoided by a conciliatory disposition and friendly intercourse between the employer and the employed on that occasion.

*Durham.*—A satisfactory termination of differences, between the masons of Durham and their employers, has been brought about by the operatives personally seeking and obtaining an interview with their employers. After the several interests connected with the trade had

been taken into consideration, and the rules submitted by the men, together with those by the masters, calmly discussed, rules for the wages of the men and the hours of labour were agreed to by the masters and the deputation, these rules to remain in force for twelve months. By this arrangement a threatened strike has been avoided.

*Newcastle-upon-Tyne.*—A large meeting of the workmen of Newcastle and Gateshead has been held, in support of the nine hours movement, when resolutions to that effect were carried with acclamation.

*Galashiels.*—The journeymen slaters of Galashiels have asked for and received an advance per week from 20s. to 22s. 6d. in wages.

## MEMORIAL OF THE LATE ARCHDEACON OF LINDISFARNE.

THE committee entrusted with the memorial-fund raised by the friends and parishioners of the late Archdeacon of Lindisfarne, aware that a porch to his church at Eglingham was one of the improvements he projected, but did not live to accomplish, have resolved that the memorial they purpose to erect should fulfil this intention. They have accordingly requested Mr. F. R. Wilson, the architect by whom the chancel of the church was restored some three years since, to carry this scheme into execution. The new porch is in the Early English style, with an entrance to the west. The gables will be surmounted with ornamental crosses; and it is hoped the funds will admit of stained glass in the windows.

## FOREIGN HONOURS TO ENGLISH ARTISTS.

THE King of Italy has conferred the title of "Baron" on Mr. S. S. Kirkup, an English artist residing at Florence, whose attention of late years has been directed to the investigation and illustration of the poems of Dante.*

The administrative committee of the Dutch Royal Academy of Fine Arts has just named Professor Donaldson a Member of that Academy at Amsterdam.

## THE "ARTISANS AND LABOURERS' DWELLINGS ACT."

THE Bill which under this title has been brought in by Mr. McCullagh Torrens provides that, upon the application of twenty ratepayers of any town, parish, or district, or by resolution of local authority adopted at a public meeting summoned in the usual manner, the Principal Secretary of State for the Home Department, on being satisfied that the deaths in the three years last preceding exceed three in the hundred [*per annum*, we suppose], shall direct an inquiry to be made by one of the Inspectors appointed under the Local Government Act, 1858, as to the sanitary condition of any street or streets, and of any house or houses, within the limits of such town, parish, or district; and the Inspector shall be required to state to what extent the dwellings inquired into are unfit for human habitation, and how far it may be needful that the same should be removed, with a view to the erection of permanent and healthful houses, suitable for the accommodation of persons subsisting by daily or weekly wages. If the recommendations contained in the report be not shown to the satisfaction of the Secretary of State to be unfitting or unnecessary, he shall require the local authority to take measures for complying with the same, or certain portions thereof, within a reasonable time, to be mentioned in such order; on which the local authority shall, without delay, cause plans and estimates to be duly prepared, of the cost of the pulling down of the houses which shall have been condemned as unfit for human habitation, and of building on the same, or some adjacent site, dwellings proper for the healthful accommodation of a number of persons, not less than that of the persons and families previously residing in the houses which shall have been removed; and such estimates shall be forwarded to the Secretary of State, without whose approval, signified in writing, no portion of the work proposed shall be begun. This being obtained, the local authority may get money from the "Consolidated Fund" at 3½ per cent., to be repaid by yearly instalments in a period not exceeding thirty years. The ownership and management of such dwellings are to be vested in the local authority. We conclude, though it is not very clear, that the owners of the property taken are to be treated with under the Lands Clauses Acts. The owner should have power himself within a given time to render the houses habitable. The Bill requires careful consideration, but has in it the germ of a much-needed measure.

* An old Correspondent of our own, Dr. Barlow, had also a title conferred upon him lately by the Italian King.

## FREE TRADE IN ART.—THE LAW COURTS COMPETITION.

SIR,—Among our present multitudinous array of art difficulties, nothing presses so hardly on my own mind as the not being able to find out readily what is orthodox and proper, and what is not. I sometimes try to get out of this difficulty by taking the very *last* public utterances of any one received authority. I therefore most humbly trust that I am now in the right road, and at any rate starting fairly and on beaten ground. Mr. Ruskin would seem to have now left off writing thick volumes, to contribute to newspapers, and to the delivery of addresses at fine-art societies and working men's meetings. One of his very last and most emphatic statements at one of these gatherings was this—and to it I ask your earnest attention, for its importance cannot be overstated—"that the great curse of modernism in all art and architectural matters is 'competition!'" Will you kindly allow me a word or two on this theme at the present juncture,—a few very plain words?

I must first, before coming to the main point, cite the authority of another eminent public teacher on this subject of "competition," the late Mr. Cobden. But a very short time before his ever-to-be-lamented death, he said of, or rather to, Mr. Gladstone,—"We have now succeeded nearly in releasing from the prejudices and hinderances of ages the materials of the earth, which can now come and go as they will: the next work is to do the same by 'labour;' let that be as free, as clear of monopoly and privilege. Who will do this?"

A very few weeks before Mr. Cobden's death, I could not resist the putting the question to him as to what he precisely meant by this emphatic statement, and to what particular labour he referred? Slave labour, Irish cabin labour, dockyard labour, lawyers' and architects' clerks' labour, or art-labour generally; and as to whether he admitted a painter or architect to be a labourer or a capitalist. I believe this was a new subject to Mr. Cobden; for I fear that, with other political economists, he rather regarded art-architecture and painting as a sort of grown-up toy-work, and only fitted for large-sized children. He confessed that he had not thoroughly thought of the subject in this new light, and that it required a great deal of thinking. I venture to say, now is the time when this subject may well occupy our thoughts a little, and that present circumstances may help, if fairly looked at, to bring into light this hitherto hidden subject. If at starting I may be allowed a definite opinion, it would be "that the greatest possible curse that art or architecture at any time can labour under is monopoly and privilege, and the *absence of competition*; and that what is now to be striven for is *free trade in art and architecture.*" I think, also, that art-architecture, as well as painting, is and must be the result of personal labour, and does not admit of any transfer or exchange. A building is a stone picture, and you must paint it yourself as though it were a picture in colours; and thus it is labour and work, and not the mere result of the labour or work of others, or the result of the employment of capital, as the digging a trench or wheeling a barrow. I mean here, of course, the indicative means, directions, and drawings to and for the executive workmen. I cannot ask you to allow me to dwell on mere principles of art action, important and new as they may be, and not a little interesting, but must proceed to apply them to the exigency of the moment. Everybody knows that there is to be a new set of law courts, whole streets have been pulled down to make way for them; and the great questions then are,—who is to do them? how are they to be done? In what style of art? Are they to be the work of our acknowledged leading architects or that of their clerks? Who are they that are privileged to compete for them, and who are they who are to labour at the competition drawings? And, lastly, when done, whose work is it? All these are momentous questions, and cannot be answered all at once. Let us try at one or two of them. One has already been answered, sir, in your last week's number, where we are told that but six of our leading architects are to be privileged to respond to this demand on professional labour; and a more unfair selection, as I take it, could not have been made, or a more inconsistent one. Let us either have *fairness* and a free-trade competition, or *consistency* and a uniform unfair and privileged monopoly. Messrs. Hardwick, E. Barry, Street, Scott, Waterhouse, and T. H. Wyatt are the strangely favoured few out of the many well-known members of the Royal Institute of British Architects. There is something truly wonderful in this list, looked at artistically and politico-economically. But the most extraordinary omission in it, as it appears to me, is this, that neither of the learned professors of architecture at King's College and University College is in the list; for what is the crying architectural want of the time in which we live? Why the improvement of those dull assistants who will be such important elements in this very competition. These learned professors are almost daily employed in the teaching and polishing of these stupid pupils and clerks, and are so far and in reality the life and future hope of professional action; is it not, therefore, truly wonderful that *such* should be excluded? Free trade in architecture! I sincerely hope that there may yet be in this competition a little fairness before it is too late, and that we may have the opportunity of judging how far "*competition*" is a blessing or a curse in matters architectural; for there can be no manner of doubt that architecture is now passing through a very painful phase, and the beginning of a better future will and must spring up *economically* as a higher order of labour or work; and that labour, competitive and personal,—in short, the perpetuation and enlargement of "the curse" of competition.

One word more in conclusion, to suggest a plan and to help architectural fine art out of its present debasement and degradation. Competion drawings, as all know, are made up of a number of useless elevations, sections, and plans, which no one ever looks at, the judgment dwelling and centring on the main elevation, section, and principal floor plan as guides to the rest. Would not these three drawings in all cases of simple competition be enough? Any competent judge would readily and without fail see enough in these drawings to decide relative merit. If this system were to be adopted in competitions, it would enable numbers to compete who are now excluded. Such drawings, of course, being *autographs*, and the *bonâ fide* work of those whose names appear in the corners. What an interest there would be in all this! Our architectural exhibitions and Royal Academy room would show thus a series of art-signatures and art-writing by the hands of those whose names they bear, and not whole wall-spaces covered with art-forgeries, the standing disgrace and shame of this art-transitional nineteenth century. A few words in the House of Commons by Mr. Tite would do this work; for the public have but to be told authoritatively how things are, and how they ought to be, to insist on what is fair and true.

C. BRUCE ALLEN.

## DEFLEXION OF BEAMS.

WILL you permit me to make a few observations with regard to the experiments on this subject recorded by Mr. Papworth in your number for the 17th inst. (p. 123), having paid some attention to the problem in question. Referring to the edition of 1845, p. 81, of "Barlow," I find that the author says, "Hence we conclude that the deflexion of a beam fixed at one end in a wall and loaded at the other, is double that of a beam of twice the length, supported at both ends and loaded in the middle with a double weight." But Mr. Papworth is incorrect in calling this "the result given from numerous experiments made with perfect apparatus by Barlow;" the whole of the formulæ being ob-

tained by mathematical *reasoning*, and not as the result of *experiment*, which *reasoning* has been shown by all later investigators to be inaccurate. Most of the formulæ given by writers on the strength of materials are obtained by mathematical induction, and experiments are instituted in order to find the values of certain constants (varying according to the *material* of which the beams are composed), so as to make them applicable for practical purposes.

I would also call Mr. Papworth's attention to the table 73, pp. 110, 111, of "Barlow," in which experiments very similar to his own are recorded. The first set of beams are all "very dry," and have been "six years in store" (taking only those reported "sound"); each is 2 in. square and projects 5 ft. The second set of specimens "were kept wet," and had also been "six years in store." The actual deflexions are not given, but on the previous page the mode of experimenting is explained; the beam being bent over a semicircle of oak 6 in. radius. In the "very dry" beams the "arc received" is $3\frac{3}{4}$ in. average, and in those "kept wet" the average is $2\frac{1}{4}$ in. So that the actual deflexion must have been at least twice as much in the former as in the latter. I refer to these experiments to show how necessary it is to take into consideration the *condition* of the timber at the time the experiment is made; and also that experiments on one or two beams are quite insufficient to settle the question.

The numerous experiments recorded by Barlow were made with a view of ascertaining the *breaking weight* of beams, so that the deflexions given are not such as can be calculated by formulæ; for, as Fenwick remarks, at page 82, "in practice only very small flexions are admitted," certain quantities being rejected in the investigation as being very small and unimportant when the deflexions are small, but which become appreciable when the deflexions are large; the real practical use of the formula being to ascertain what weight may be laid on a beam without producing perceptible deflexion. The only experiments given by Barlow which will allow of comparison with the formula are seen in table 70, p. 106. These were made by Col. Beaufoy, at Deptford Dockyard, on twenty-five pieces of Riga fir, all cut from the same tree, each piece being 2 in. square, and projecting 4 ft. from the wall, and weighted at the outer end. The mean weight laid on was 98 lb., and the mean of the deflexions of the twenty-five specimens was 1° 22′, "measured on a graduated arc of the same radius as the beam, viz. 4 ft." The vertical deflexion, therefore, is $48 \times \sin 1° 22' = 1{\cdot}145$ in. Now the formula given by Fenwick, p. 86 (omitting weight of beam) is, deflexion $= \frac{4\,W\,l^3}{E.\,b\,d^3}$, where $b$, $d$, and $l$, are all in inches, and E is the *modulus of elasticity*, say 2,000,000, the highest number for fir.

From this formula we get deflexion = 1·355 in. which is $\frac{2}{10}$ in. *more* than the experiments give, the timber being, no doubt, of first-rate quality. Barlow remarks, "It appears from all these experiments that the deflexions are very nearly in the ratio of the weights, till about one half, or a little less than one half the weight, is laid on, after which they become more rapid, and very irregular." So that experiment shows the formula would not be correct in this case if W exceeded 98 lb.

In experiments of this sort great care is necessary to have the beam firmly wedged into the wall, as described by Barlow at p. 114, as the least play will nullify the results. The formula which Mr. Papworth quotes from "Gregory" is identical with that given by "Fenwick," only in the former the length is in *feet*, and in the latter in *inches*, and I is the moment of inertia of the section; so that the formula applies to all forms of section, and in the rectangle $I = \frac{1}{12}bd^3$. In calculating the deflexion of a beam fixed at one end, and loaded with a weight, W, at the other, $\frac{3}{8}$ of the weight of the projecting beam should be added to W.

E. WYNDHAM TARN, M.A.

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MR. PAPWORTH'S letter may render some service, if it lead practical men to make experiments on the deflection of timber. Those whose acquaintance with the calculus, and whose leisure, may enable them to follow the elegant process by which deflection (or rather the *law* of deflection) is mathematically found, will not hesitate to affirm the correctness of the formulæ given, and the conclusions drawn, by Mr. Tarn (p. 895 of your last volume), quoting from Mr. Fenwick; conclusions no more peculiar to those gentlemen than the opinion that two and two make four. By *correctness* I mean, that if you grant the premisses, you cannot escape the conclusion.

Of course, with a right formula we may have a wrong *modulus*; and here is a weak point. We want extensive, accurate, systematic experimenting, to get at something like reliable average *moduli* of elasticity for different descriptions of timber. Not but that, when all is done, there will remain wide scope for observation and practical judgment in the endless varieties of elastic strength that occur even in one and the same kind of timber.

Again, the formulæ go on the assumption that the piece of timber is *perfectly uniform* in size and elasticity throughout, with no tendency to bind irregularly or to twist.

With regard to the beam having one end fixed in a wall, the fixture must be *absolute*, and this is not an easy thing to ensure.

If a piece of timber, such as your last correspondent describes (p. 123), were supported in the middle, and a $\frac{3}{4}$ cwt. hung at each end, 3 ft. 6 in. from the support, and a mean taken of the deflections where the weights hung, I think the experimenter would be in a better position to test the accuracy of the theorists.

To examine the first set of experiments reported by Mr. Papworth, and compare the results with theory:—Let us accept the fact that the piece of fir deflected $\frac{21}{20}$, or 1·05 of an inch, with $1\frac{1}{4}$ cwt. in the middle, and make this the basis of calculation.

Beam supported at both ends:—

| | Inches Deflection. Theory. | Actual. |
|---|---|---|
| With $1\frac{1}{4}$ cwt. at quarter distance ..... | 0·59 | 0·60 |
| ,, $\frac{3}{4}$ cwt. ,, ,, ..... | 0·30 | 0·35 |
| Beam supported and fixed at one end:— | | |
| With $\frac{3}{4}$ cwt. at D ..... | 1·05 | 1·80 |
| ,, ,, F ..... | 0·44 | 1·08 |
| ,, ,, E ..... | 0·13 | 0·63 |
| ,, ,, G ..... | 0·02 | 0·25 |

The excess of deflection, as observed, being 0·75 at D, 0·64 at F, 0·50 at E, and 0·23 at G. These excesses, being approximately as the distances from the support, suggest the idea of the support, or fixing down, having yielded or started, in some small degree,—a thing not likely to occur were experiments made, as I suggest, with both ends loaded, and the support in the middle.

If the observed depressions, at G, E, F, and D, were genuine *deflections*, I trust your practical readers will bear with me when I submit that they would be as the cubes of distances of weight from support, or as the numbers 64, 27, 8, 1. That such is far from the case will appear on comparing the following figures:—

| | | | | |
|---|---|---|---|---|
| Observed..... | 1·80 | 1·08 | 0·63 | 0·25 |
| If as cubes of distances, would be..... | 1·80 | 0·76 | 0·22 | 0·03 |

CHARLES E. CONDER.

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## THE VOLUNTARY ARCHITECTURAL EXAMINATIONS.

SIR,—I cannot help asking why it is that, with such a large demand for the "Regulations and Forms of Application" for the above examinations, there should be such a scarcity of candidates.

Is it that the ordeal is too severe? I think not. I have carefully looked over every paper of questions issued by the examiners, and have not succeeded in finding a single approach to undue "stiffness," and I know from personal inquiry among the candidates that they are generally satisfied with them. What, then, is the reason? Two causes suggest themselves. Either the young architects of our day are consciously unable to win the honour, or the honour is not sufficiently worth the struggle. That the first is the true interpretation I cannot admit. I believe the cause is to be found in the fact, that the honour, when won, has no name, and therefore little commercial value. Young aspirants for distinction—no matter how much they may desire it for its own sake—would seek it much more ardently if it conferred a status, or had a name.

It may be objected that the Institute has no power to give diplomas. Granted: but the members can elect Fellows and Associates, and why not also give the "passed candidates" a status at the Institute? Let them be called Licentiates, or anything else, provided the name expresses the honour, and is easily understood. I urge this on the consideration of "whom it may concern."

AN INTENDING CANDIDATE.

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## STAINED GLASS.

*Sheffield Parish Church.*—A stained glass window has been placed in this church to the memory of a late townsman, Mr. W. Smith. It consists of three transom lights and tracery, and is of the Perpendicular period. The glass is designed, drawn, and coloured in accordance with the stonework. The leading idea is the Victory of Our Lord over Death and the Grave, illustrated in the upper part principally by His Resurrection; in the centre light and in the two side lights, by miracles of Our Lord, namely, in the dexter, the Raising of the Widow's Son of Nain; and in the sinister, the Raising of Lazarus. Below the transom in the centre light is the Archangel St. Michael overcoming the Dragon, as a type of Our Lord's victory over sin and hell. In the dexter light is the subject of Jonah and the Whale,—a type of the Resurrection; and in the sinister, the Redemption of Isaac. In the tracery are angels, with scrolls, bearing texts. The work has been carried out by Messrs. Hardman & Co., of London and Birmingham.

*Glasson Church (near Lancaster).*—A painted window has been erected in this church by Mrs. Starkie to the memory of her husband, the late Mr. Nicholas le Gendre Starkie, of Huntroyd, Lancashire. It is an Early English triplet, having in the centre light the Crucifixion, inclosed, and surmounted by a wrought canopy. At the base is inscribed the text, "I am the resurrection," &c. Above and below are emblems of the Trinity, &c. The side lights are in grisaille, with panels in the centre, on which are inscribed suitable texts. Above and below each panel is placed an emblem of one of the Evangelists. Each light is inclosed within a border, in keeping with the character of the window. The artists were Messrs. R. B. Edmundson & Son, of Manchester.

*St. Thomas's, Oxford.*—A good memorial window has just been completed by Mr. O'Connor, of London, and is about to be placed in St. Thomas's Church, Oxford. The figures represent three eminent divines of the Early Church, namely, St. Ambrose, St. Chrysostom, and Pope Gregory the Great. The colour of parts is excellent.

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## COMPENSATION CASES.

*Barclay* v. *The Metropolitan District Railways.*—This was a compensation case referred out of the Court of the High Bailiff of Westminster in consequence of an insufficient attendance of jurymen. Mr. Hornblower was the arbitrator selected, and he has just published his award. The property consists of a double house, Nos. 19 and 20, Shaftesbury-terrace, let on lease for twenty-one years to Messrs. Shanks, coachmakers, at 200*l.* a year, seventeen years and a half of this term being now unexpired. The lease under which it is held has fifty-eight years to run at 12*l.* The principal dispute was as to the annual value in reversion, the claimants' witnesses, Messrs. E. Roberts, Driver, and Chadwick, placing it at 400*l.*, and Messrs. Horsey and Trollope at 500*l.* The company's witnesses, Messrs. Ryde, Clifton, and Gouldsmid, at 280*l.*, and Mr. Anwyn at 270*l.* The results were, for the claimant, Mr. Roberts, 4,865*l.*; Mr. Driver, 4,558*l.*; Mr. Chadwick, 4,725*l.*; Mr. Horsey, 5,123*l.*; Mr. Trollope, 5,123*l.*; and for the company, Mr. Ryde, 3,875*l.*; Mr. Clifton, 3,836*l.*; Mr. Gouldsmid, 3,836*l.*; Mr. Anwyn, 3,751*l.* The award is for 4,602*l.* We understand that the offer was 3,700*l.*, subsequently increased to 3,800*l.*

*City of London Brewery Company (Limited)* v. *The Corporation of the City of London.*—This was a claim for compensation (at Lord Mayor's Court, before Mr. Forsyth, Q.C., and a special jury) in respect of the "Crown and Horse-shoe" Tavern, situate at the corner of Bartlett's-buildings, Holborn, required for the Holborn Valley Improvement. It appeared in the course of the inquiry that the house had not been doing a very large trade lately, but it was the opinion of the manager of the Company that with care and an expenditure of 1,500*l.* the house might be made a very valuable one. Mr. Orgill, valuer, said he knew the "Crown and Horse-shoe," and he could improve it for 1,500*l.* so that the trade should increase to a most profitable extent. There was a lease of 60 years to run from May, 1858. The value of the property as it stood was 5,250*l.*, assuming that the trade could be brought up to 300*l.* per month. Looking at the property in its present position, the compensation ought to be 4,125*l.* A thoroughfare trade was better than a local trade. Mr. Hawkins urged for the Corporation that the full value of the house was only 1,000*l.*, although, taking the figures of the plaintiffs they could only be brought up to 1,200*l.* His Lordship having summed up, the jury, after retiring, awarded the claimants 1,200*l.* as compensation.

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## CASES UNDER THE METROPOLITAN BUILDING ACT.

### PROJECTION OF SHOP-FRONTS.

MR. WARNE was summoned to Marlborough-street by Mr. Hakewill, district surveyor of St. George's, for making a shop-front so as to project more than 10 in. from the external wall, contrary to the 26th section of the Metropolitan Building Act.

After the case had been fully discussed on both sides,—

Mr. Tyrwhitt (magistrate) said,—This is a summons under the Metropolitan Building Act, 18 & 19 Vic. c. 122, sec. 26, for making certain portions of a shop-front, No. 3, Bruton-street, to project more than 10 in. from the external wall, contrary to the above enactment. It appears to me, on viewing the premises and considering the various enactments, that the above section 26 applies to projections over public ways in streets, and not, as in this case, to projections not extending beyond private property. Clause 5 of section 26 seems to show that under clause 2 of the same section a shop-front may extend 10 in. into a street beyond the general line of fronts there. Now, if "fronts," as used in that part of the section mean "shop" fronts, I find that this is not a projection beyond the "general line" of the shop-fronts there; and if that word "fronts" means "fronts," not shop-fronts, the projection is not beyond the general line of the other fronts in Bruton-street, which I apprehend to be not the external walls of the houses (those terms not being used), but the fronts of the private property fronting those

houses; that is, the edge of those areas abutting on the street. I dismiss this summons on the above ground; but I am also inclined to think that under clause 5 of section 26 the 10 in. of projection allowed to shop-fronts in streets 30 ft. wide are not to be measured from the external wall of the houses, those words not being found in that part of the clause; but with regard to the general line, either of the shop-fronts in the streets or of the other fronts of the private property there—for instance, the areas. The projection in question, if illegal, at all, appears to me to fall within the Local Management Act of the same date with the Act here proceeded on, or Michael Angelo Taylor's Act.

The worthy magistrate, unless wrongly reported, has got into sad confusion, and has expressed opinions on which we should not advise builders to rely. His decision in the present case may be right (having looked at the front, we are disposed to think it is); but the reasons he gives to justify it unquestionably are wrong.

## THE NOTTINGHAM SUBWAYS AND AMENITIES OF JOURNALISM.

WE were under the impression that the periodical press of England was universally conducted at this time in, at any rate, a courteous and gentlemanly manner. We were mistaken; and we must take the liberty of giving the proof of our error. It occurs with reference to the discussion that followed the reading of a paper on the Gas Supply of Paris at the Society of Arts, an official report of which we printed.* Commenting on that discussion *The Journal of Gas Lighting* writes as follows:—

"Mr. Godwin, of the *Builder*, opened an attack on the gas companies, as being adverse to improvement, and he told a romantic story about a proprietor of gas shares holding a pistol to his head and threatening to blow out his brains for having initiated a cheap-gas movement. He then pronounced his *dictum*, in opposition to the opinion of the most eminent engineers in France and England, that it is idle to say that the escape of gas in subways cannot be guarded against. Unfortunately for his argument he adduced the case of Nottingham, in which town he said the laying of gas-pipes in a subway had been carried out without damage, and he asserted that the plan was a perfectly practicable one, and that it would be a disgrace to the gas companies if they persisted in opposing its adoption. Mr. Hawksley and Mr. Gore completely demolished the *conceited ignorance* of such assertions by stating the results of their experience. Mr. Hawksley having been the engineer of the Nottingham Gas-Works, was able to expose the fallacy of any reliance on the experiment of a subway in that town. He stated that it was a 'pitiful channel' only 200 yards long," "that the gas-pipe was only 4 in. in diameter," and so on.

Our readers who have seen the communication from Mr. Tarbotton, the Nottingham Corporation Surveyor, endorsing Mr. Godwin's statements, know that Mr. Hawksley's assertions were altogether erroneous; and will, we have no doubt, think with us that if the writer of the above specimen of "pilite letters" do not now offer a frank and full apology he will show as little regard for honesty as he has already done for propriety.

## CHURCH-BUILDING NEWS.

*Thruxton.*—The parish church here has been re-opened after being restored. The porch (an unpretending piece of seventeenth-century work), which had all but tumbled down, has been entirely restored. The font has been removed from beneath the tower to nearer the entrance door, raised on a base of red sandstone, and fitted with a spiral cover of parquetry work, which is raised by means of a cord and weight. The cover is octagonal in shape, having gablets on each side, pierced alternately with quatrefoils and trefoils. In removing the plaster from the walls the jambs and arch of the west window were found entire, but there was no tracery or mullions. The window has now been recessed, showing both the jambs and the arch. In the restoration of the tower, the chief object was the introduction of sufficient light, the ground floor portion being used as a vestry, and this has been accomplished by means of a glass floor, one square of which runs on rollers, in order to admit of a person ascending to the belfry. The floor is laid on oak beams of ornamental character. The nave has been re-seated with open oak benches, and the old square pulpit replaced by a new one, octagonal in shape, with the panels sunk and traced, and an ornamentation in ball-flower pattern running along the cornice. A stone base supports the woodwork. The chancel has been fitted with stalls of oak, with carved foliage, and the old altar, the top of which was a stone slab, has been superseded by a new one of oak. There is a reredos of stone of reddish tinge, with encaustic tiles, and a simple Maltese cross of green marble inserted in a moulded panel in the centre. In the east window the stained glass bequeathed by Mrs. Wetherell (formerly Miss Clive), in memory of her husband, the archdeacon, has been inserted: it is a three-light window, in the Perpendicular style, the subject of the centre light being Our Saviour as the Good Shepherd, the sinister light displaying the disciples listening to his words, "Feed my lambs," and the dexter light showing a group of sheep. The floor of the church has been laid throughout with encaustic tiles of different patterns from the manufactory of Lugwardine. The jambs of the west side of the chancel arch, which were squared to about 3 ft. from the ground, in order to form a base for the old rood-loft, have been preserved by the architect, whose object it has been to conserve the original features of the building. The total cost of the restoration will amount to about 400*l.* Mr. E. Biggleston, of Hereford, was the builder. The architect employed was Mr. Chick. Several relics were found in the course of the necessary excavations for carrying out the work of restoration, and when the present rector came to the parish eight years ago he found numerous fragments of stained glass about the church. Among them was a fourteenth-century figure of Our Lord upon the Cross: this is being restored by Messrs. Hardman, of Birmingham, with a view of being placed in the two-light window on the south side of the chancel.

*Bradford-on-Avon.* — The parish church of Bradford-on-Avon, which has recently undergone rebuilding and restoration, has been re-opened. The work of restoration was commenced some two years ago, but unforeseen difficulties arose and hindered its progress. The total cost of the work is between 4,000*l.* and 5,000*l.*, and the contractors were Messrs. Gane & Son, of Trowbridge, assisted by Mr. J. Berry, of Trowbridge, who did the plumbing; Messrs. J. & W. Taylor, of Trowbridge, who did the masonry; Messrs. Mercer & May, of Bath, the roof on south nave; Mr. Jones, of Turley, who restored the north aisle; Mr. Brown, of Bradford, the gas fittings; Messrs. Lyndsey & Charles Long, other portions. The south wall has been rebuilt, the gallery removed, the pillars rebuilt, and the Kingston aisle restored. Modern pews now take the place of the old-fashioned high pews, and the floor is laid with encaustic tiles.

*Islington.*—The new church of St. Barnabas, which has lately been erected in Harvest-road, Upper Holloway, has been consecrated by the Bishop of London. The church has been erected at a cost of 7,000*l.*

*Gloucester.*—Mr. J. C. Dent, of Sudeley Castle, has presented to the cathedral a lectern, at a cost of 250*l.*

*Horsmonden.*—The re-seating and otherwise restoring the parish church has been resolved upon as a memorial of the late Rev. Sir W. M. S. Marriott, bart., rector of the parish. Subscriptions to the amount of 360*l.* have been at once collected.

## Miscellanea.

MARYLEBONE SURVEYORSHIP. — Mr. T. G. Browning, late assistant-surveyor, has been elected chief surveyor, by a majority of 16, in room of Mr. Robert Scace (resigned).

CARLISLE.—The vacant office of surveyor to the corporation has been filled by the appointment of Mr. Edward Morley, an assistant in the office of Mr. Brierley, civil engineer, Blackburn. The salary is 300*l.* per annum.

UTILIZATION OF SUPERHEATED STEAM. — The tremendous effects of a small quantity of water turned suddenly into superheated steam have long ago been remarked upon. It was not, however, until recently that an attempt was made to utilize this extraordinary power. Mr. E. Danford, of Illinois, United States, has, it is said, succeeded in making a powerful machine, of which this is the motive power. The principle may be illustrated by recalling the circumstance of a foundry roof having been blown away some years ago in the north of England, in consequence of a hollow ball of metal, into which a small quantity of water had made its way, having been thrown into a furnace. Mr. Danford suspends his ball, which he calls a steam generator, in a furnace, and procures the steam to work his engine by intermittent jets of water into the interior of the ball.

ABATTOIRS FOR LIVERPOOL.—The corporation have resolved to erect large abattoirs in the outskirts, and then to suppress all slaughter-houses in the town itself.

THE TESTIMONIAL TO COLONEL M'MURDO.—Out of the fund which has been subscribed by the Volunteers for the purpose of re-building Rose Bank, the residence of the gallant officer, 1,850*l.* have been paid to the builders.

CO-OPERATION. — The Joint-stock Coal Company (Limited), after declaring a dividend of 10 per cent. on the capital, have paid an additional bonus of 4 per cent. of the total profits to the consuming shareholders, which is equal to a return of 2s. 6d. per ton upon the price paid for their coal.

CAMBRIDGE HOUSE, PICCADILLY. — According to the *Owl*, the amount of the purchase-money to be paid for Gloucester House, which is to be pulled down in the course of the Park-lane improvements, is 60,000*l.* Of this, 20,000*l.* are to be paid to the Duke of Cambridge for the unexpired lease of fourteen years, and 40,000*l.* to the trustees of the will of the late Sir Richard Sutton for the freehold.

SELINUNT.—The excavations in Selinunt, the ancient Phœnician Solunt, near Palermo, have been recommenced under the direction of Signor Cavallari, the archæologist. Three ancient streets, among them probably the principal street of the ancient town, have been laid open. A number of glass vessels from these, partly ornamented and inscribed with Greek legends, have been placed in the Museum of Palermo.

THE T. P. COOKE PRIZE PLAY.—Twenty-four plays were sent in under the terms of the competition proposed by the will of the late Mr. T. P. Cooke; and from these, we hear with great pleasure, the committee have selected a drama by Mr. Angiolo Slous, entitled "True to the Core." Mr. Slous is well known as the author of "The Templar," and several other plays of high class. His abilities and worth are the most highly estimated by those who know him best. The premium is 100 guineas; but we take for granted the author will have other advantages should the piece, when acted, prove a success.

VALUE OF LAND AT BRADFORD. — Recently another public sale of building ground, the surplus (after widening by the corporation) of one part of Well-street, in that town, took place at Bradford. There was a large attendance. The first plot consisted of 264 square yards; the second of 199 square yards; and the third of 222 square yards. There is a victualling licence attached to the first plot. 17*l.* per yard was the highest sum offered, and the plot was withdrawn at 20*l.* per yard. The second plot was withdrawn at 13*l.* per yard. The third plot, situated between the first and second plots, and having frontage to two streets, was sold for 17*l.* 11s. per yard, to Messrs. J. Sharp & Son, of Bingley.

A ROLLER FOR MORTAR.—A correspondent, "R. T.," draws attention to some composition rollers by Messrs. Harrild. He says,—"I believe a more economic and speedy mode of laying mortar on bricks might be adopted by the aid of these composition rollers, which will pick up any quantity of mortar, cement, &c., distributed evenly on a board or slab, and deposit the mortar on the bricks. They would equalize the layer, prevent waste, facilitate the work, splashing and smudging face-work would be avoided, and probably pointing may become unnecessary. The roller might also be used to expedite certain descriptions of plastering work, painting, or tarring, for it will pick up a small quantity, and deposit the same quite as easy as a thick coating."

TIMBER IN JAPAN. — The island of Yesso is thickly covered with immense forests, containing numerous kinds of wood admirably adapted for building purposes. Oak and ash come from the interior of this island; Shendai and Nambu supply us abundantly with pine. A small export trade has been carried on in this article by one of the foreign British merchants at this port, who has also erected a steam saw-mill. As yet, little business has been transacted with the Japanese, but there can exist no doubt that these endeavours will be ultimately crowned with a brilliant success, and that the Japanese will speedily appreciate the immense superiority of machinery over manual labour. The machinery in the mill consists of one frame saw, two circular saws, and one treenail machine. The engines are 15-horse power (nominal), and the amount of work done per day is 6,000 lumber ft.

* See p. 114, *ante*.

THE CONSTITUTION OF THE METROPOLITAN BOARD OF WORKS.—In the Commons, Mr. B. Cochrane has given notice that on an early day he will move for the appointment of a select committee to inquire into the constitution of the Metropolitan Board of Works, the office of Public Works, and the office of Woods and Forests.

"THE BROWN BOOK."—In our notice of "The Brown Book for 1866," we took occasion to suggest that the addresses of the respective theatres should be appended to the descriptions of them given in "The Brown Book." On looking further into its pages, however, we find that although this is not done in the more prominent account of the theatres, there is a separate list of theatres, music-halls, &c., in which not only the addresses, but the prices and the times of opening are all concisely inserted. Giving information of the same thing in two forms and places of one book, however, should be avoided.

FALL OF RISE CARR IRONWORKS, DARLINGTON. The workmen, to the number of about 170, employed at the Rise Carr Ironworks (fortunately for their lives, as it now appears), turned out lately on strike, on account of the masters, Messrs. Fry, Janson, & Co., refusing to advance the rate of remuneration for working an inferior kind of material. Last week the wind was very high, and the immense building, after rocking for a moment or two, actually fell into ruin, leaving the tall chimney standing. A labourer was killed on the spot, and other six were all severely injured. It will be some months before another structure can be erected.

A NEW GREEK ISLAND.—In the Bay of Thêra (Santorin) an island has of late been rising from the sea, steadily and slowly,—not by the up-cast of volcanic matter, accumulating heap upon heap, but apparently from volcanic accumulations below, pushing upwards the matter already forming the surface. The material consists of a rusty black metallic lava, very heavy, and resembling half-smelted scoria which has boiled from a furnace. In five days the island attained a height of from 130 ft. to 150 ft., with a length of upwards of 350 ft. and a breadth of 100 ft. Other islands in the same bay have so arisen in past times, and the bay itself is the concave circuit of a broken volcanic cone.

THE LATE DR. PETRIE AND HIS FAMILY.—It is to be hoped that Government will continue the pension of 200*l.* a year, which Dr. Petrie had, to his four daughters. Dr. Petrie well merited this small pension for his public services, and he spared no cost within his means in adding largely to the Museum of Celtic Antiquities, which in his youth he had commenced to form, and which is now of national importance to Ireland, and ought to be secured to the Royal Irish Academy and the country, and not dispersed, as so many collections of Irish antiquities have been, from want of liberality on the part of the Government. The president of the Royal Irish Academy lately delivered a just and graceful eulogy on Dr. Petrie.

THE HOLME RESERVOIRS.—The reservoirs in the neighbourhood of Holmfirth do not appear to be in a very satisfactory state at present. The Bilberry reservoir, which caused such a loss by bursting in 1852, has again shown symptoms of weakness in the embankment; so much so that it was found necessary, on Sunday last, to draw off the water to the level of 33 ft., in order to prevent an accident. The embankment was found to have been partly washed away by the side of the waste-pit, about 40 ft. from the bottom. The reservoir at Holm-Styes is also considered by the inhabitants of the district to be weaker than it ought to be, and some apprehensions have been felt about its safety, which have caused it to be closely examined.

FALL OF ANOTHER RAILWAY VIADUCT NEAR HUDDERSFIELD.—Part of the Whitaker Mill viaduct, on the branch line from Huddersfield to Kirkburton, has given way, and stopped up the canal. It was of brick, and composed of seven arches, each 64 ft. span and 21 ft. 4 in. rise, with piers 8 ft. 6 in. thick, and on a curve with a radius of 22 chains. The centres were removed from the two first arches about two months ago, and afterwards a slight subsidence was noticed in the second arch; but it was not considered dangerous. The frost following the wet weather has had the effect of breaking it down, bringing with it the first arch. The *débris* filled up the canal. The rebuilding of the arches will take some months.

LONDON ASSOCIATION OF FOREMEN ENGINEERS. The thirteenth anniversary dinner of this association has taken place at the Freemasons' Tavern. Mr. J. M. Ravenhill, C.E., presided. The company numbered about 250 gentlemen. From a report which was read by the Secretary (Mr. D. Walker), it appeared that the various departments of the association had continued to progress during the past year. Mr. J. Newton, president of the association, in the course of some remarks, dwelt particularly on the fact that this association had nothing whatever to do with trade disputes; that its great objects were to create and foster a good feeling among employers and employed; to make the employed more intelligent and better workers; and to provide against the consequences of sickness and death.

## TENDERS

For new premises in the Waterloo-road, for Mr. W. G. Trewby. Mr. T. Danby, architect:—

| | General Items. | Add for Plate Glass. | Add for Patent Shutters. | Deduct for old Materials. |
|---|---|---|---|---|
| | £ | £ | £ | £ |
| Coleman | 3,975 | 190 | 300 | 50 |
| Hart | 3,740 | 210 | 290 | 40 |
| Conder | 3,694 | 182 | 210 | 48 |
| Colls & Son | 3,649 | 175 | 200 | 50 |
| Foster | 3,013 | 163 | 170 | 32 |

For new buildings for the Hornsey Gas Company. Mr. Jabez Church, architect. Quantities by Messrs. Lander & Bedells:—

| | |
|---|---|
| Mansfield | £3,556 0 0 |
| Piper & Wheeler | 3,552 0 0 |
| Hill & Keddell | 3,300 0 0 |
| Colls & Son | 3,260 0 0 |
| Dabbs | 3,190 0 0 |
| Plowman | 2,958 0 0 |

For new Church, Kilburn:—

| | |
|---|---|
| Patman | £9,193 0 0 |
| I'Anson | 8,930 0 0 |
| Piper | 8,800 0 0 |
| Mansfield | 8,800 0 0 |
| Dove | 8,560 0 0 |
| Patrick | 8,530 0 0 |
| Myers & Sons | 8,154 0 0 |

For additions and alterations to warehouse at Shoreditch, for Messrs. Bailey. Mr. J. W. Reed, architect:—

| | |
|---|---|
| Carter & Son | £770 0 0 |
| Lamble | 689 0 0 |
| Hoar | 666 0 0 |
| Denner | 570 0 0 |

For addition to house at Cold Ash, near Newberry, for the Rev. W. M. Pickthall. Mr. W. Harvey, architect:—

| | |
|---|---|
| Lamble (accepted) | 750 0 0 |

For new front, re-seating, &c., Northgate-street Chapel, Bury St. Edmund's. Messrs. Bacon & Bell, architects:—

| | |
|---|---|
| Rednall (accepted) | £450 0 0 |

For new Hotel, Harwich. Mr. Horace Darken, architect:—

| | |
|---|---|
| Dobson | £1,001 10 0 |
| Lee & Baker | 956 5 0 |
| Butcher | 862 0 0 |
| Everitt | 859 10 0 |
| Newton | 857 0 0 |
| Wilding | 794 0 0 |

For a residence, West Bergholt. Mr. Horace Darken, architect:—

| | |
|---|---|
| Holland | £950 0 0 |
| Shepherd & Son | 920 0 0 |
| Dobson | 898 0 0 |
| Eade | 890 0 0 |
| Lee & Baker | 872 0 0 |
| Everitt | 849 15 0 |

For new warehouse, Lant-street, Borough, for Mr. Thomas Peel. Mr. Joseph S. Moye, architect:—

| | |
|---|---|
| Simpson | £3,580 0 0 |
| Newman & Mann | 3,395 0 0 |
| Stoner | 3,340 0 0 |
| Rider & Son | 3,270 0 0 |
| Bland | 3,202 0 0 |
| Perry & Co. | 3,090 0 0 |
| Coleman | 3,079 0 0 |
| Henshaw | 3,037 0 0 |
| Walton | 2,994 0 0 |

For new shop-front and fittings at 157, Brompton-road, for Messrs. Hopgood & Jacobs. Mr. Joseph S. Moye, architect:—

| | |
|---|---|
| Sapwell | £320 0 0 |
| Stimpson | 280 0 0 |
| Parkinson | 265 10 0 |

For villa residence, Barnet. Mr. Joseph S. Moye, architect:—

| | |
|---|---|
| Walton (accepted) | £714 0 0 |

Accepted for new warehouse in Laura-street, Bishop Wearmouth for Mr. A. Swaine. Mr. J. Tillman, architect. Quantities supplied:—

*Mason's, Bricklayer's, and Slater's Work.*

| | |
|---|---|
| W. & R. Allison | £551 10 0 |

*Joiner's and Carpenter's Work.*

| | |
|---|---|
| Tulip | £259 0 0 |

*Ironfounder's, Plumber's, and Gasfitter's Work.*

| | |
|---|---|
| Tomkinson | £120 0 0 |

*Painter's and Glazier's Work.*

| | |
|---|---|
| Barnblett | £17 0 0 |

For alterations at Nos. 61, 62, 63, and 64, Houndsditch, for Messrs. Farquharson & Co. Mr. G. Sparks, architect:—

| | |
|---|---|
| Henshaw | £605 0 0 |
| Sparks | 604 0 0 |
| King & Sons | 595 0 0 |
| Heeps (accepted) | 585 0 0 |

For dwelling-house, Upton-lane, Stratford, E., for Mr. Hampton. Mr. J. M. Smith, architect. Quantities supplied by Messrs. Curtis & Son:—

| | |
|---|---|
| Garrud | £1,045 0 0 |
| Curtis | 1,015 0 0 |
| Harris | 987 0 0 |
| Dyer | 970 0 0 |
| Rivett (accepted) | 943 0 0 |

For new villa, Finchley-road, Child's-hill. Messrs. Mayhew & Calder, architects:—

| | Carcass of Villa. | Stable complete. |
|---|---|---|
| Chinnock | £855 0 0 | £265 0 0 |
| Hyde | 840 0 0 | 260 0 0 |
| Mann | 787 0 0 | 273 0 0 |
| Curtis (accepted) | 720 0 0 | 284 0 0 |

For alterations and additions to a warehouse, Castle-street, City. Mr. Herbert Ford, architect:—

| | |
|---|---|
| Palmer & Son (accepted) | £350 0 0 |

For part of the decorations to the Elms, Erith, Kent. Mr. Herbert Ford, architect:—

| | |
|---|---|
| Horner (accepted) | £78 0 0 |

For alterations and additions to the Queen's Arms, Caledonian-road, for Mr. Prout. Mr. T. Brookes, architect:—

| | |
|---|---|
| Cowland | £590 0 0 |
| Perry | 549 0 0 |
| Batchelder | 543 0 0 |
| Gillett & Wisbey | 530 0 0 |

For alterations to the Duke of York, Upper Rathbone-place, for Mr. W. Owston. Mr. T. Brookes, architect:—

| | |
|---|---|
| Gillett & Wisbey | £385 0 0 |
| Lawrence & Baugh | 369 0 0 |
| Tracey | 332 0 0 |
| Walker | 285 0 0 |

For alterations to the Duke of York, Clerkenwell, for Mr. Thos. Cruso. Mr. T. Brookes, architect:—

| | | Allowed for Old Materials. |
|---|---|---|
| Keene | £298 0 0 | |
| Worme | 270 0 0 | |
| Martin | 273 15 0 | £10 0 0 |
| Gillett & Wisbey | 275 0 0 | 15 0 0 |

For new gas-works at Folkestone. Mr. J. G. Barlow, engineer. Quantities by Messrs. Pain & Clark:—

Contract No. 1.

| | |
|---|---|
| Matthews (accepted) | £6,474 0 0 |

Contract No. 2.

| | |
|---|---|
| Cockey & Son (accepted) | £6,284 0 0 |

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We are compelled to decline pointing out books and giving addresses.

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